Procuring the Future: A Study of Low Carbon Procurement Processes for Sustainability in Wales

Hushneara Miah

A Thesis Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy of Cardiff University

Cardiff Business School
Cardiff University

2019

Abstract

This thesis is the outcome of a collaborative study with the Climate Change Commission for Wales that examines the implementation of low carbon procurement. The research investigates low carbon procurement initially across the public, private and third sectors in Wales, with an especial emphasis on the public sector.

The thesis contributes directly to the limited literature on sustainable public procurement, which is situated within the field of sustainability. In so doing, the research fills a lacuna in the extant literature by exploring the implementation process of low carbon procurement within the public sector, exploring the respective drivers, barriers and enablers relevant to its implementation, and providing insights from policymakers, government agencies and public sector procurers.

This research marks the second time in which an action research strategy has been utilised in the field of sustainable public procurement. Data was collected through interviews, workshops, secondary data and a reflective research diary. The action research strategy, through its three emergent research cycles, represents an expedient approach through which to make a significant contribution to academic research and practice. Data was analysed thematically by hand, and its interpretation was largely informed by institutional theory and the resource-based view.

The findings generated by this study both operate on, and are presented at, three-levels of analysis, comprising of society (Macro), organisations and teams (Meso), and individuals (Micro), which aids the identification of relevant drivers, barriers and enablers. The research findings identified that the drivers, barriers and enablers of low carbon procurement are both similar and different to those identified in the extant literature on sustainable public procurement; for example, leadership was present in the study, which is consistent with previous literature, but on different levels. Consequently, it is necessary to adopt a multi-level approach in order to advance the field of sustainable public procurement. Notable contributions include findings related to the need for greater cohesion, alignment, transformational leadership, resources and interventions in the public sector to support the implementation of low carbon procurement. Furthermore, the research demonstrates that, whilst practical interventions can aid the implementation of low carbon procurement, this can potentially be limited by institutional barriers.

Keywords: carbon, low carbon procurement, sustainable procurement, sustainability, Wales, policy, public sector, institutional theory, resource-based view.

Declaration

This work has not been submitted in substance for any other degree or award at this or any other university or place of learning, nor is being submitted concurrently in candidature for any degree or other award.

Signed ..... (candidate) Date 07/03/19

STATEMENT 1

This thesis is being submitted in partial fulfilment of the requirements for the degree of PhD.

Signed ..... (candidate) Date 07/03/19

STATEMENT 2

This thesis is the result of my own independent work/investigation, except where otherwise stated, and the thesis has not been edited by a third party beyond what is permitted by Cardiff University's Policy on the Use of Third Party Editors by Research Degree Students. Other sources are acknowledged by explicit references. The views expressed are my own.

Signed ..... (candidate) Date 07/03/19

STATEMENT 3

I hereby give consent for my thesis, if accepted, to be available online in the University's Open Access repository and for inter-library loan, and for the title and summary to be made available to outside organisations.

Signed ..... (candidate) Date 07/03/19

Acknowledgments

Completing this thesis has been an incredible adventure for me, in part because of how dear the topic is to me. It simply would not have been possible to complete this journey without the guidance and support from a number of individuals and organisations. I sincerely thank them all from the bottom of my heart.

Firstly, I would like to express my deepest gratitude to my exceptional supervisory committee, Professor Ken Peattie, Professor Helen Walker, Dr Anne Touboulic and Dr Jane Lynch, who have provided invaluable guidance throughout the process of conducting my research and completing my thesis. I can honestly say that they have been absolutely superb and nurturing throughout the course of my candidature. They generously took me under their wing, and their care and patience generated the perfect atmosphere for conducting scholarly research. The endless chapter reviews and insightful feedback has indelibly shaped the direction of this thesis and my academic development overall. Ken, your in-depth knowledge of sustainability is something I truly cherish, whilst your research and scholarship is what many of us aspire to. Helen, your contribution directly to sustainable public procurement (SPP), leading the discipline, I often read, cite and admire. Anne, your support, endurance and guidance went beyond anything I could have imagined. Jane, your sincere, caring and innumerable contributions have truly been inspirational. I look up to you all, and deeply respect the quality of the contribution you are making to the field.

I would also like to give a special thank you to Dr Tony Ellson. The PhD was a journey I started with you, and your constant guidance, encouragement, advice and spirit of adventure is something I will always hold very dear. I hope retirement is treating you well.

Whilst this journey has not been without its difficulties, the friends I have made along the way have made it significantly easier. I am eternally grateful to my wonderful circle of friends and colleagues at the Cardiff Business School for their enduring support and kindness. It is only right to personally thank Anna Galazka, Andrew Rogers and Karen Wontner for their support, guidance and friendship, as well as for making the journey more enjoyable due to the many lovely moments we shared. Andrew, my dear friend, you and I started our PhD journey together many years ago. You are simply an inspiration to me. I will always remember the comments about your beans and biscuit data set. You are someone that could make me smile at even the most difficult of times. Anna Galazka, where do I start, I value our friendship and have tremendous admiration and respect for what you have achieved and the determination and drive that you possess. Karen Wontner, you have been a great source of advice and are someone in my field who I have been able to share my research with and discuss my frustrations and joys with along the way. The journey becomes what it is due to the people that you share it with.

I would like to thank the Economic Social Research Council (ESRC) of Britain for supporting me financially through my Scholarship, along with many other hopeful academics in the early stages of our careers. I would also like to thank the Climate Change Commission for Wales and Cardiff Business School's Public Value fund for their respective financial contributions towards aspects of the field work. Without your commitment and contribution this research would have not been possible.

I would also like to thank Cardiff University and the faculty for having continual faith in my ambition across my academic studies. My time at Cardiff University is something I will forever cherish; indeed, I am now a fully-fledged Cardiff University alumnus and am proud to have had the opportunity to attain all four of my degrees from this wonderful institution.

I would like to thank all the amazing staff at the Climate Change Commission for Wales, the Future Generations Commissioner's Office and Value Wales, both for their commitment to the area and their endurance for the kind of change that is required in Wales. In particular, I would like to show special appreciation for two people that I feel incredibly fortunate to have met: Dr Eurgain Powell and Gunther Kostyra. Your passion for and remarkable insight into sustainability in Wales is inspirational, and the selfless manner in which you endorsed this research is truly valued.

I am exceptionally grateful to all those who contributed both directly and indirectly to this research. I would like to take this opportunity to thank all the organisations and individuals involved in the research. In particular, special thanks go to all those who were involved from the public sector who, even during turbulent times, continued to appreciate the importance of this research, and, in turn, selflessly took valuable time out of their schedules to make their respective contribution. This research provided a unique opportunity to bring people together via common ground to examine something which greatly affects the future of Wales.

I would also like to thank my earliest teachers, my mother and father, who are strong yet gentle souls, who above all taught me to have faith, to believe in hard work, to stand up for what is right and strive for great things. Without their love and support over the years none of this would have been possible. You have always been there for me and I am thankful for everything you have helped me achieve. Starting out from humble beginnings, we have come a long way.

It is with the deepest gratitude and warmest affection that I make a special thank you to all my friends and family. To my mother and father in-law, I thank you for your enduring support, patience and words of wisdom throughout this journey. Our debates and discussions about current affairs are something I continue to cherish.

This long road has been made easier and more palatable by my husband Manik, my rock. Your friendship over the years has kept me sane, especially during those periods when the journey towards this PhD seemed never ending. Your love, support, encouragement and inexhaustible patience have been imperative to the completion of this thesis. Your help and guidance over the years is unmeasurable and without it I would not be where I am today.

Finally, I want to give a personal thank you to Wales, a place I am immensely proud of. Wales is a special place that welcomed me with open arms at the age of six and nurtured me throughout the years. To have this opportunity through the thesis to make a contribution to the Welsh government and policy is something I absolutely treasure. Wherever I may go in the world, I take great pride to call Wales my home.

Without the support of all those mentioned above, as well as numerous others I have failed to personally acknowledge, this simply would not have been possible. I am truly blessed to have such special people in my life.

As I close this chapter of my life, I do it with nothing but fond memories.

Table of Contents

List of Tables

List of Figures

Glossary of Abbreviations

ABS - Association of Business Schools
AR - Action Research
BBC - British Broadcasting Corporation
BW - Menter a Busnes, Business Wales
CCC - Committee on Climate Change
CCCW - Climate Change Commission for Wales
CPT - Central Policy Team
CEW - Constructing Excellence Wales
CH4 - Methane
CO_2 - Carbon Dioxide
CO_2e - Carbon Dioxide equivalent
CSR - Corporate Social Responsibility
DECC - Department of Energy and Climate Change
EA - Environment (Wales) Act
EC - European Commission
ESRC - The Economic and Social Research Council
EST - Energy Saving Trust
EU - European Union
FDI - Foreign Direct Investment
FG - Future Generations
FGC - Future Generations Commission
FGCO - Future Generations Commissioner's Office
FSB - Federation for Small Businesses
GDP - Gross Domestic Product
GHG - Greenhouse gases
GPP - Green Public Procurement
HEFCEW - Higher Education Funding Council for Wales
IPCC - Intergovernmental Panel on Climate Change
ISO - International Organisations for Standards
IT - Institutional Theory
NHS - National Health Services
NAW - National Assembly for Wales
NPS - National Procurement Service
OM - Operations Management
PB - Planetary Boundaries
PhD - Doctor of Philosophy
RQ - Research Question
SCM - Supply Chain Management
SCP - Sustainable Consumption and Production
SD - Sustainable Development
SLR - Systematic Literature Review
SoPP - Social Public Procurement
SP - Sustainability Procurement
SPP - Sustainable Public Procurement
SRB - Sustainable and Responsible Business
SSCM - Sustainable Supply Chain Management
SW - Sustain Wales
UK - United Kingdom
UN - United Nations
UNCED - United Nations Conference on Environment and Development

UNFCCC - United Nations Framework Convention on Climate Change
VW - Value Wales
WAG - Welsh Assembly Government
WBFG - Well Being of Future Generations
WCED - World Commission on Environment and Development
WG - Welsh Government
WLGA - Welsh Local Government Association
WPP - Wales Procurement Policy
WPPS - Wales Procurement Policy Statement
WRAP - Waste & Resources Action Programme
WSSD - World Summit on Sustainable Development
WVCA - Wales Council for Voluntary Action
WWF - World Wide Fund for Nature

1 Introduction

"Climate change is destroying our path to sustainability. Ours is a world of looming challenges and increasingly limited resources. Sustainable development offered the best chance to adjust our course."

Ban Ki-moon (2012)
Secretary-General
United Nations

The growth of sustainability has developed in parallel with discourses around climate change and carbon dioxide (carbon) emissions and has now become the subject of extensive academic research in recent decades, which, in turn, has aided the term's transition from being merely a catchphrase to becoming a substantive concept (Lele 1991; Mebratu 1998; Walker and Brammer 2012). Climate change, constitutes a key component of environmental sustainability discourse, designates a change in climate that can be *"attributed either directly or indirectly to human activity that has altered the composition of the global atmosphere, in such a way that goes beyond natural climate variability over comparable time periods"* (United Nations Framework Convention on Climate Change 2011, Article 1). A critical causal factor of climate change is the increase in greenhouse gases (GHG),[1] the most significant being carbon dioxide (carbon), resulting from human activities (Jenkins et al. 2009). There is an emergent scientific consensus, represented by the International Panel on Climate Change (IPCC 2007a), that human activity, specifically the releasing of GHG into the atmosphere, has raised global temperature by 0.6°C over the course of the preceding three decades (Jenkins et al. 2009). This has translated into the volume of polar ice and alpine glaciers halving during this period, and a rise in sea level of around ten centimetres (European Environment Agency 2017; NOAA 2017). Bellard et al. (2012) explain how rising temperatures threaten key ecosystems globally, including coral reefs, tropical rain forests and alpine habitats. Our planet has finite resources and a finite ability to absorb the waste and pollution that we create without impairing its natural systems and their productivity (ANPED 2012; Mora et al. 2013).

[1] Corrieia et al. (2013, p. 58) notes: the greenhouse gases (GHG) are considered to contribute the most to climate change and included in the Kyoto Protocol are: Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). However, carbon for its ubiquity and relative proportion in the atmosphere is usually used as shorthand for the remaining GHG, and general emissions' values are usually presented as tonnes of CO_2e (carbon dioxide equivalents). In this work, carbon and GHG will be used interchangeably.

1.1 Sustainability

This thesis contributes to the field of sustainability, specifically by focusing on the implementation of Low Carbon Procurement (LCP), as part of Sustainable Procurement (SP). To fully understand the contribution that the following research can make to sustainability, one must first operationally define the key concepts of *'sustainability'* and *'sustainable development'*. The first and most commonly cited definition of sustainable development comes from Dr Gro Harlem Brundtland, chair of the World Commission on Environment and Development (WCED), who states:

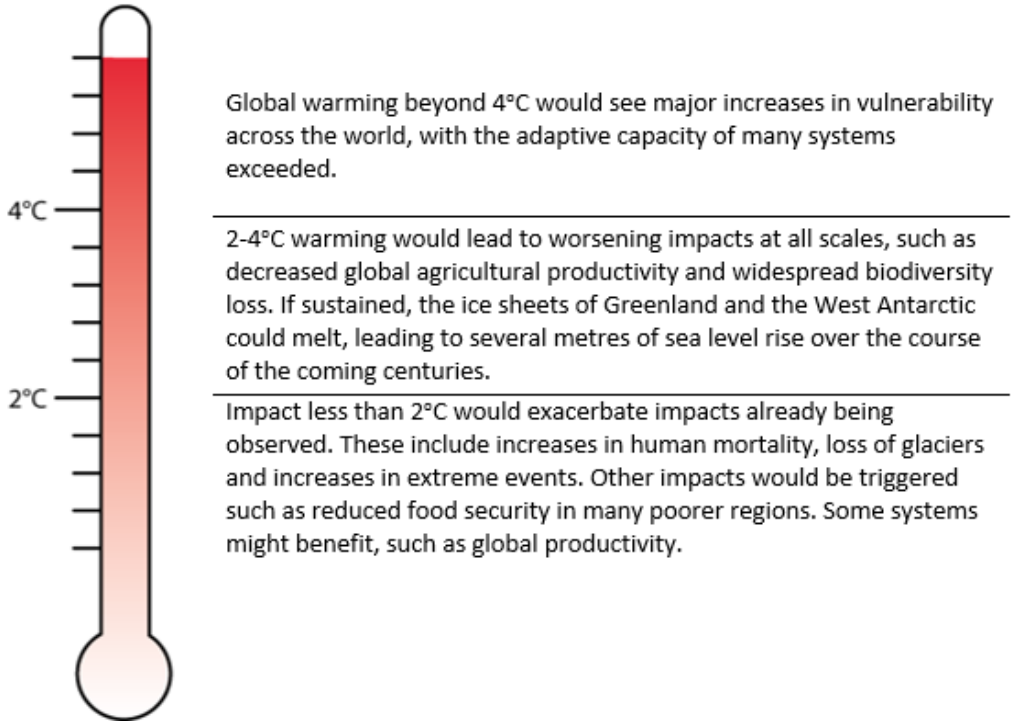
> *"Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs."*
>
> *WCED (1987, p. 12)*

Despite the widespread usage of this definition, within the business academy there is no universally accepted definition of the term *'sustainability'*; although it is routinely understood as comprising of three components: *'environment'*, *'society'* and *'economy'* (Folke et al. 2002, p. 437).

The origins of LCP stem from the 1992 United Nations Conference on Environment and Development (UNCED) that was held in Brazil, commonly referred to as either the *'Rio de Janeiro Earth Summit'*, the *'Rio Summit'* or the *'Earth Summit'*. This conference was the first of its kind in which issues surrounding climate change and carbon reduction were deemed to be of paramount concern for the future of our planet and humanity. In this context Sustainable Consumption and Production (SCP) formed a key talking point in the summit. Although climate change was not the only topic at the 1992 conference, it has emerged as the most notable theme and from 1992 onwards carbon reduction initiatives have developed, with a particular focus upon SCP themes and, even more specifically, procurement (Nikoaou and Loizou 2015). There has been a shift in thinking towards developing low carbon economies, which by implication will aim to embed low carbon ideologies within the area of procurement. The conference spearheaded a range of international provisions and collaborative action between nations. One notable achievement of the summit was the agreement of the United Nations Framework Convention on Climate Change (UNFCCC), known as the Climate Change Convention, which sought to stabilise atmospheric GHG concentrations at levels that prevent dangerous interference with climate systems (UN 1992). This was followed by the Kyoto Protocol which imposed targets for the

reduction of carbon emissions by 80% by 2050, which was then proceeded by numerous other international events and treaties, most recently the Paris Agreement in 2015, which primarily focused on maintaining the increase in global average temperature to well below 2°C above pre-industrial levels (UNCC 2018). Figure 1.1 depicts the potential changes that could occur as a consequence of changes in temperature by degrees.

Figure 1.1. Global average temperature above pre-industrial levels thermometer



Source: IPCC (2007b, p. 11)

In the three decades following the Rio Summit, the climate change debate and the carbon reduction agenda have emerged as a fundamental concern for the majority of countries across the world. Two additional Earth Summits have taken place in Johannesburg (South Africa) in 2002 and Rio di Janeiro (Brazil) in 2012, which were each billed as a *'World Summit on Sustainable Development'*. At present, there are 192 nations signed up to the Kyoto Protocol out of 195 nations worldwide recognised by the United Nations (UN) (UNFCCC 2018). Moreover, manifold international initiatives, including the Treaties, Conventions and Summits have been transposed onto the national level, to the extent that most countries, including developing countries, now accept climate change and the need for carbon reduction and are implementing legislation and provisions to address the concerns (UN 1992; UNCC 2018).

1.2 Connection between LCP and SPP

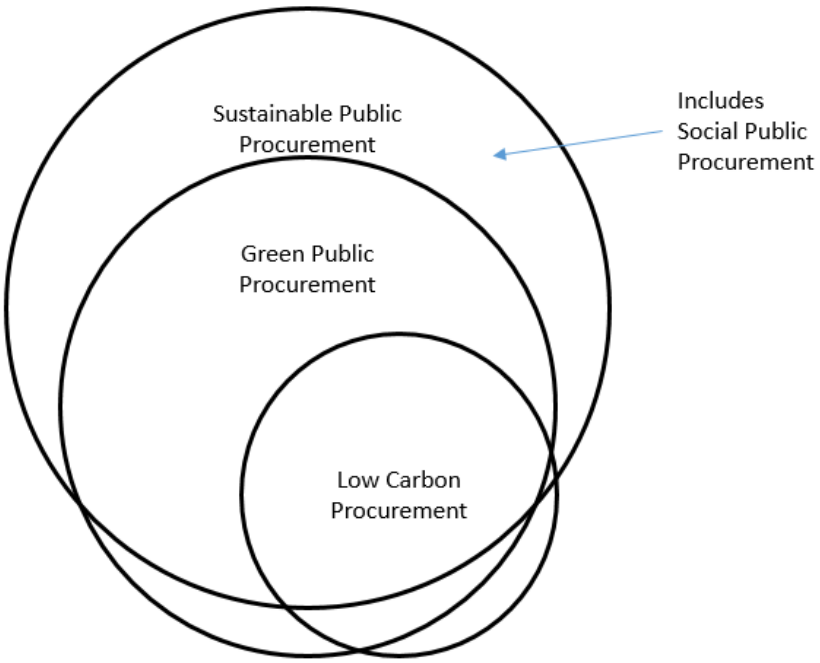
This thesis makes a direct contribution to literature on Sustainable Public Procurement (SPP) to which LCP is a sub-discipline. The thesis adopts the definition of LCP put forward by Correia et al. (2013, p. 61), which designates it as *"The process whereby organizations seek to procure goods, services, works and utilities with a reduced carbon footprint throughout their life cycle and/or leading to the reduction of the overall organizational carbon footprint when considering its direct and indirect emissions."* Due to the recent emergence of LCP, at the onset of writing the PhD thesis there was no established definition of LCP in the public sector (i.e. public sector specific definition), and thus the most logical choice was to apply this definition within the context of public sector organisations. It is worth noting that the practice of LCP is more practiced in the public sector due to policy pressures. Table 1.1 contains definitions for all the sustainability concepts used in this thesis while Figure 1.2 schematises the connection between the concepts.

Table 1.1. Definitions of Sustainability Concepts

Sustainability Concepts	Definition
Sustainable Public Procurement (SPP)	*"…the act of integrating a concern for broader social and environmental impacts within procurement undertaken by government or public sector bodies. Research concerned with SP is either concerned with the direct or indirect achievement of broader social and environmental ends through procurement activities."* (Brammer and Walker 2011, p. 455)
Social Public Procurement (SoPP)	*"…defined as public procurement where the contracting authority applies additional socially oriented requirements."* (Kordestani 2017, p. 313)
Green Public Procurement (GPP)	*"Green Public Procurement (GPP) is defined as purchasing which reduces environmental impacts across product or service life cycles."* (Rainville 2017, p. 1029)
Low Carbon Procurement[2] (LCP)	*"The process whereby organizations seek to procure goods, services, works and utilities with a reduced carbon footprint throughout their life cycle and/or leading to the reduction of the overall organizational carbon footprint when considering its direct and indirect emissions."* (Correia et al. 2013, p. 61)

[2] At the onset of writing the PhD thesis there was no established definition of low carbon public procurement (i.e. public sector specific definition), and thus the most logical choice was to apply this definition within the context of public sector organisations.

Figure 1.2. Relationship between SPP, GPP and LCP



Source: Adapted from Correia et al's (2013, p. 61) model

Figure 1.2 illustrates the proposed relationship between SPP, GPP and LCP. Correia et al. (2013, p. 60) explain that this *"not only highlights their hierarchical status (i.e. low carbon issues are an element of wider environmental concerns, which, in turn, are part of the wider sustainability agenda), but also the fact that, as conceptual phenomena, they are likely not to overlap perfectly."* As Correia et al. (2013, p. 60) further delineate, *"If LCP implies a prioritization of carbon criteria, then it could mean in some cases having to compromise on other important environmental issues (e.g. toxic chemicals, water), or socioeconomic aspects (e.g. place of origin, labor standards)…This is because procurers will have to deal with multiple trade-offs between the LCP agenda, and other complex organizational or political priorities, facing types of 'wicked problems' as identified by Rittel and Webber (1973) where there are no clear solutions."* It is thus possible that some LCP decisions can be viewed as being less rather than more sustainable, depending upon the different weightings accorded to different elements of the sustainability agenda. Therefore, whilst commissioning a nuclear power station would constitute LCP, the question of whether it qualified as an example of green or sustainable purchasing is a contentious one, which depends upon the weightings afforded to other factors such as risk and the environmental costs of nuclear waste storage and facility decommissioning. For the purposes of this thesis, discussions of LCP assume that they contribute towards greater sustainability, but yet as the model derived from Correia et al. (2013) makes explicit, this is not always guaranteed.

1.3 Research evolution

Despite international recognition of the climate change agenda, there has been a relative paucity of academic research examining the important area of LCP (Correia et al. 2013). This lacuna in both literature and practice affords the opportunity to investigate this area, to provide a valuable contribution to academic literature and society at large, which the research presented here sought to address. In light of the potential benefits stemming from it, this research was supported by the Climate Change Commission for Wales (CCCW). Financial contributions also came from CCCW and Cardiff Business School's 'Public Value' fund (Cardiff University) at different stages of the research. Moreover, the contextual setting of Wales provides a unique opportunity to investigate the concept of LCP and contribute towards engendering real change at a policy level. The fact that this thesis contributes to both theory and practice in this area constitutes one of its principal strengths.

It is important to note that though this research is a collaborative study between Cardiff University's Business School and the CCCW, all the research was conducted by the author. The research evolved from an initial smaller study commissioned by CCCW and Cardiff University's Business School to investigate LCP in Wales. During this preliminary research, the author conducted interviews and secondary research to form the basis of a report. This was supervised by Professor Walker and Dr Touboulic at Cardiff Business School. This preliminary research created a demand for the larger-scale research effort represented here, and effectively laid the foundation for this entire thesis.

The broad aim of the initial study was to conduct primary research, which consisted of interviews with multiple participants from the public, private and third sectors to ascertain how carbon is considered within procurement. The author was also provided with the opportunity to serve as lead author on a White Paper titled *'Thinking about the future: the consideration of carbon within the procurement process in Wales'* along with Professor Walker and Dr Touboulic, currently available online on the CCCW website.

1.4 Research aim

The findings outlined in the initial report, combined with a review of the literature identified a lacuna in extant SPP literature and practice, specifically a failure to address the drivers, barriers and enablers in the public sector related to LCP. This provided the focus for this research to explore LCP in greater detail in the context of Wales to bridge this gap in

knowledge. The author proposed to conduct an in-depth investigation within the parameters of PhD research to address, the question of:

How can LCP within the public sector potentially contribute to progress towards sustainability, and how can we understand and manage the processes and factors relevant to its effective implementation?

1.5 Action Research

This thesis adopts an Action Research (AR) strategy and pragmatic approach. AR is a methodology that stresses the importance of conducting active real-time inquiry. This research developed organically through three distinct action-reflection cycles (with the preliminary research mentioned above representing 'Cycle One'), which represents a fundamental aspect of AR (McNiff 2013). McNiff and Whitemead (2011, p. 35) state that *"action researchers let their own story evolve"*. Resultantly, a research diary was used to document the progress of the contemporaneous research. Diary extracts are presented at various intervals in the thesis to narratively frame the research and writing-up process. The rationale for adopting this approach was that it allowed the author to proceed in a flexible, non-linear, direction as opposed to being restricted by prescribed and rigid methodologies which limit the scope for breaking boundaries. To the best of the author's knowledge, this thesis marks the first time that AR has been utilised in the context of LCP, which is a sub-discipline of SPP. Only one paper adopting AR is present in SPP literature. This non-traditional approach afforded the opportunity to develop the direction of the research based on the findings at various cycles. The author is hopeful that the potential limitations of this approach are outweighed by its strengths and the contribution the study makes to the field. One further issue focused on how to maintain fidelity to the fluidity of an AR approach, whilst, simultaneously, presenting the findings within the prescribed format and requirements of a doctoral thesis. Ultimately, after examining the data, the author made the decision to largely structure the thesis in a conventional format, whereby one chapter encapsulates the methodology and research design, as well as features of AR such as reflective diary entries within chapters and findings and discussion presented cycle-by-cycle. The overall aim here was to provide a level of balance and fulfil the PhD requirements, whilst remaining true to the spirit of AR.

1.6 Guide to thesis

Three AR cycles of inquiry were conducted, underpinned by four research questions that were spread across the cycles to answer the overarching research question (RQ). Cycles against research questions are displayed in Table 1.2.

Table 1.2. Cycles & research questions

Cycle	Research Questions
One	RQ1: How is carbon considered in the procurement process?
Two	RQ2: What are the major drivers of LCP within the public sector, and how do they operate? RQ3: What are the major barriers and enablers of LCP within the public sector, and how do they operate and interact?
Three	RQ4: How can practical interventions enable the transition towards the effective implementation of LCP?

Unlike more linear PhD research structures in which all questions precede primary research, the above questions emerged out of the distinct cycles in a live setting. To answer the four research questions, the thesis is structured in eight chapters. Figure 1.3 provides an overview of the chapters and cycles in the thesis.

Figure 1.3. Guide to thesis (Author)

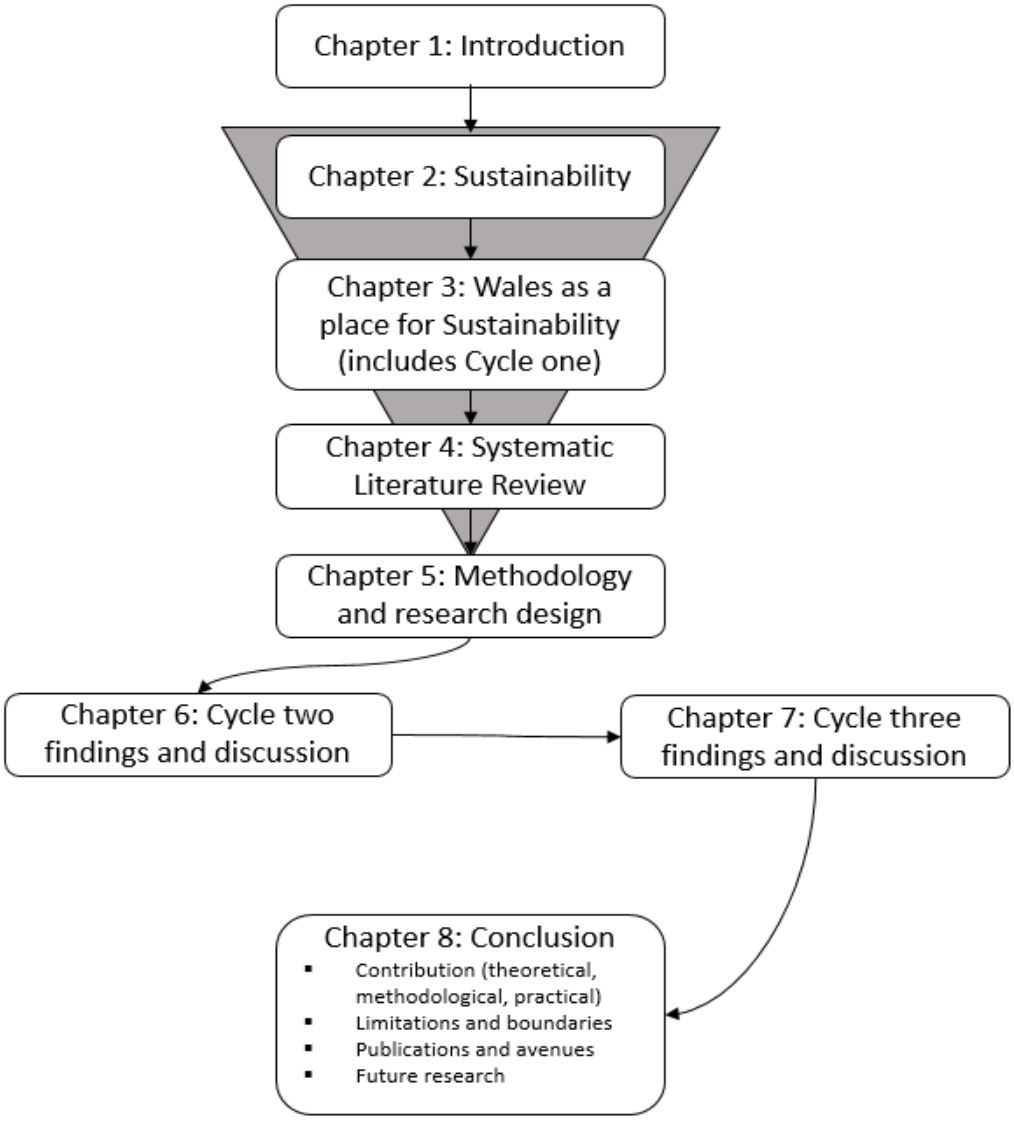


Figure 1.3 provides a visual illustration of the structure of the thesis, outlining both the chapters and the three cycles of inquiry. The diagram also utilises a transparent overlapping inverted triangle to illustrate how the research was whittled down from the broad sustainability topic down to SPP over the course of chapters 2-4 to establish avenues where a study into LCP in the public sector can make a contribution.

Overall, the thesis comprises eight chapters as follows: Chapter One outlines the direction and scope of the thesis. Chapter Two traces the evolution of the concept of sustainability from three distinct perspectives: the policy field; management field; and the academic field. Within this chapter a definition of sustainability is adopted for the thesis. Chapter Three seeks

to delineate the reasons why Wales is a pertinent location for the present research and presents Cycle One findings. Chapter Four presents a systematic literature review (SLR) of SPP. Chapter Five outlines the methodology and research design for the intended research. Chapter Six presents Cycle Two findings and discussion. Chapter Seven presents Cycle Three findings and discussion. Chapter Eight concludes the thesis with the reflection on the respective strengths and limitations of the research, contributions made and potential scope for future research.

1.7 Summary and Conclusion

In its capacity as a preface to the thesis, the chapter outlines the global interest in the broad scope of topics around climate change and carbon reduction respectively, before delineating their connection to sustainability. It provides a contextual overview of climate change discourse and illustrates the importance of the three United Nation Earth Summits in the preceding three decades for bringing this subject to the national level. This chapter distils the connection between LCP and SPP, which is fundamental in conceptualising this thesis. The chapter also sheds light on how the initial research began as a smaller collaboration (Cycle One) between CCCW and Cardiff University's Business School, before subsequently serving as the foundation for the PhD thesis. This is followed by a short overview of the adopted AR strategy and an evaluation of its expedience for this research. Subsequent to this, the chapter addresses how the study will be presented in such a way that adheres to the requirements of thesis examination whilst still embodying the spirit of AR. As a result, research diary extracts will feature in this thesis illustrating key events, thoughts and dilemmas that shaped the research study. The chapter then presents the overarching research question and the four sub-research questions, which are divided across the three cycles of inquiry. Finally, the structure of the thesis is illustrated in a flow diagram, which is followed by a succinct summary of each of the thesis chapters.

The key point to be taken away from this chapter is that this thesis will research LCP, a relatively niche area of SPP, in a way that does not follow a traditional linear style of research and data collection. This is due to the fact that the purpose of the research, and the questions to be investigated, organically evolved over the course of the three research cycles. The next chapter traces the historical evolution of the concept of sustainability in an attempt to provide a contextual framework from which to review sustainability and its progression, paying especial attention to the necessity to address climate change through public procurement.

2 Sustainability

2.1 Introduction

This chapter constitutes the first of two literature review chapters. It traces the evolution of the concept of sustainability from three distinct perspectives: the policy field; management field; and the academic field. In so doing, the chapter aims to provide a contextual framework from which to review sustainability and its subsequent progression from sustainable development (SD) through to the field of SPP, with an emphasis on the publication of the Brundtland Report in 1987 (WCED 1987), the Stern Review (2006), and the Earth Summits (1992; 2002; 2012) as critical milestones.

The chapter then proceeds to provide a précis of academic literature in the field, emphasising the manifold definitions and interpretations of sustainability and SD. This is followed by an analysis of the Stern Review (2006), which stresses the need to address climate change through public procurement. A later chapter provides a SLR of peer reviewed journals in the field of SPP, which represents the principal focus of this thesis.

2.2 Evolution of the concept of Sustainability

The word "*sustainable*", in the sense of something having the capability to endure across time, has become part of the contemporary lexicon being widely applied to both natural resources (such as within agriculture in terms of sustainable yields) or human activities (including wars, strategies for businesses or government activities). Lee (2000, p. 32) cautions that the contemporary usage of sustainability pays scant reference to its *"intellectual and historical roots",* particularly with respect to its usage by biologists and ecologists to describe the rates at which renewable resources can be extracted or damaged by pollution without threatening the underlying integrity of ecosystems. The term also has its roots in systems science where, in an analogous fashion to how the term is applied to ecological systems, it has been discussed in terms of system stability, and more recently the interactions between social and ecological systems (Jennings and Zandbergen 1995). Consequently, as interest in the concept of sustainability has evolved, so has its application in a wide range of fields. This thesis mainly focuses on the emergence of sustainability in the field of public policy; the application of sustainability in the field of management; and the conceptualisation of sustainability within scholarly inquiry.

2.2.1 The Emergence of Sustainability: Public Policy

Contemporary concern over sustainability, in terms of its conceptualisation within the present thesis, emerged out of the environmental and counterculture movements of the 1960s and 1970s, before subsequently being articulated within key international policies from the 1970s onwards. For instance, the 1972 Stockholm UN Conference on the Human Environment focused on the relationship between numerous factors and actors, including government, economic activity, poverty, resource use, pollution, wildlife and education, and ultimately laid the foundations for the subsequent emergence of SD as an explicit policy agenda. The ensuing UN Action Plan also included a recommendation (number 70) that constitutes one of the earliest policy references to global climate change, stating that governments should be *"mindful of activities in which there is an appreciable risk of effects on the climate."* In the same year, a paper published in *'The Ecologist'* used the term *"sustainable"* for the first time in conjunction with industrial expansion and its impact on the environment (Goldsmith et al. 1972), whilst, subsequent to their 1971 meetings, the Club of Rome published their book *'Limits to Growth',* which explored the potential environmental limits to continued economic and population growth (Meadows et al. 1972).

Sustainability as an overt policy agenda was first encountered in 1975 when the World Council of Churches extended its historical mission to create a just and participatory society to now include creating a just, participatory and sustainable society (Cobb 1992). The 1980 World Conservation Strategy developed further the notion that contemporary approaches to economic growth were environmentally unsustainable, and that preserving the quality of the environment not only meant opposing economic growth, but rather necessitated the integration of economic activities and environmental management in pursuit of a more sustainable form of society (McCormick 1986). The strategy document introduced the term *"sustainable development"*, to define a mode of economic and social development geared towards delivering socio-economic (and by implication ecological) sustainability as an end state (Diesendorf 2000). The strategy concluded that: "*For development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource base; and of the long term as well as the short-term advantages and disadvantages of alternative actions.*" (IUCN et al. 1980, Introduction)

Perhaps the most pivotal moment in the development of the concept of sustainability in terms of policy making, economic development, business conduct and education was the publication of the Brundtland report in 1987 (WCED 1987). This was a landmark moment

because it brought together the business and policy-making spheres and mainstreamed discussion and debate around the issue of sustainability. Daly (1990) and Hansson (2010) argue that the impact of the Brundtland report upon environmental policy in the twentieth century cannot be overstated. The report also put forward a definition of SD which, although simplistic, is nevertheless the most widely quoted definition (as discussed later in this chapter). Since the publishing of the Brundtland report in 1987, SD has become a core feature of environmental discourse and played an increasingly important role within national and international policy agendas. Both the antecedents of the Brundtland report and the key milestones subsequent to its publication are presented in Table 2.1.

Table 2.1. Key reports and events in the evolution of sustainability

Year	Event	Location	Description and any output
1972	UN Conference on Human Environment	Stockholm	SD was a key theme of the conference. The concept was coined explicitly to propose that it was possible to pursue economic growth and industrialisation without accruing environmental damage.
1980	World Conservation Strategy document	N/A	Sustainability was used in the World Conservation Strategy document titled: *"World Conservation Strategy: Living resource conservation of Sustainable Development"*.
1987	Brundtland Report	N/A	This represents a key report for the environmental movement. It brought together business and public policy. It also conceptualised the most widely used definition of sustainable development.
1992	World Summit on Sustainable Development (WSSD) (Earth Summit)	Rio de Janeiro (Brazil)	The Earth Summit, also known as the United Nations Conference on Environment and Development (UNCED), issued a declaration of principles (i.e. Rio Declaration). A plan of implementation was initiated through key outputs from the Rio Declaration, Agenda 21 agreement, and conventions on desertification, biodiversity, and climate change.
1995	UN Commission on Sustainable Development, Global Scenario Group	Stockholm Environment Institute	The Board on SD conducted a scenario analysis of a proposed *"Sustainability Transition,"* focusing specifically on hunger and the emission of greenhouse gases. The Global Scenario Group quantified its scenarios through 2050 (approximately two generations).
1997	Kyoto Protocol	Kyoto (Japan)	The Kyoto Protocol, an international treaty, was signed which extended the 1992 UNFCCC that committed State Parties to reduce greenhouse gas emissions by 80% by 2050 based on the premise that (a) global warming exists and (b) human-made carbon emissions caused it.
2002	World Summit on Sustainable Development (WSSD) (Earth Summit)	Johannesburg (South Africa)	This marked the 10-year anniversary of the first Earth Summit. It promoted 'partnerships' as a non-negotiated approach to sustainability. Article 2 of the UNFCCC was produced which focused on two themes: a green economy in the context of sustainable development and poverty eradication; and an institutional framework for SD.
2012	United Nations Conference on Sustainable Development (Earth Summit)	Rio de Janeiro (Brazil)	Focused on securing a renewed political commitment towards SD, by assessing the progress to-date and identifying the remaining gaps in the implementation of the outcomes of the major summits. A key focus was *'The future we want'* (UN 2012).
2015	United Nations Climate Change Conference, Conference of the Parties (COP) 21	Paris (France)	The conference negotiated the Paris Agreement, which is historic as it aims to help limit the increase in temperatures to 2 degrees overall, and to 1.5 degrees by the end of the century.

Post Brundtland Report - development of sustainability

The next major development was the 1992 Earth Summit in Rio, from which the *"Rio Declaration on Environment and Development"* was issued. Ferns and Amaeshi (2017, p. 13) consider the Rio summit to be *'special'* in two respects. Firstly, it attracted an unprecedented assortment of international actors, comprised of 108 heads of state, 2,400 representatives from civil society organisations and NGOs, as well as 10,000 attendees (UN 1997). Secondly, it established the basis for the next two decades of global SD policy-making. The event has been characterised as a trigger point for key activities and interest in the area due to its principal focus of *"Time for change"* (Correia et al. 2013), which was exemplified through Agenda 21, the summit's implementation plan (Ferns and Amaeshi 2017). A key component of the Rio Declaration involved green purchasing being incorporated into the principles of sustainable production and consumption (SCP), an area which will be discussed later in this chapter. Agenda 21 marked the point at which procurement as a policy implementation tool began to be encouraged in the area, representing a key output from Rio that proposed *"an implementation plan to support regional and national initiatives was created to accelerate the shift towards Sustainable Consumption and Production (SCP) themes and to de-link economic growth from environmental degradation"* (Fuentes-Bargues et al. 2017, p. 207).

By signing Agenda 21 and the Rio summit's Declaration the United Kingdom (UK) government signalled their commitment to pursuing SD, which required making environmental protections central to long-term economic development and laws to reduce unsustainable patterns of production and consumption (Thomson and Jackson 2007). The UN's document from 1992 outlining Agenda 21 notes: *"[humanity] stands at a defining moment in history"* (para1.1) and that Agenda *21 "aims at preparing the world for the challenges of the next century"* (para 1.3). Agenda 21 also (paragraphs 4.23, 4.24, 4.25, 4.56) emphasises how the greening of government procurement could be hugely significant for public policies seeking to introduce the main principles of sustainability (Nikolaou and Loizou 2015).

Agenda 21 has hitherto been adopted by more than 178 Governments, and whilst it lacks the force of international law, adoption of Agenda 21 carries with it a strong moral obligation to ensure the appropriate implementation of the strategies. The central belief of this "*global partnership*" is that all countries can simultaneously pursue and experience growth whilst protecting the environment. In the interim, there has been a range of country specific legislation and policies introduced to protect the environment, including the introduction of

the Climate Change Act (2008) by the United Kingdom (UK) Parliament and Well-being of Future Generations (Wales) Act 2015 (WBFG Act) and the Environment (Wales) Act 2016 (EA) by the National Assembly for Wales (NAW).

Carbon constituted a key topic within the Rio declaration, and this continued in 1995 with the UN Commission on SD, Global Scenario Group's work on the transition to sustainability. Specifically, this group focused on the dual challenge of reducing GHG and tackling global hunger and helped to lay the foundations for the 1997 Kyoto protocol, an international treaty which extended the 1992 UNFCCC that committed State Parties to reduce GHG emissions, based on the premise that (a) global warming exists and (b) human-made carbon emissions have significantly contributed to it. Today, the Kyoto Protocol and its calculations are still used as baseline figures for current and future reductions in carbon emissions.

The Rio Summit in 1992 and future summits in Johannesburg in 2002 and Rio+20 in 2012 are recognised for their role in mainstreaming SD (Ferns and Amaeshi 2017). However, there has been limited tangible progress made in addressing the challenges posed by climate change, poverty alleviation and biodiversity loss (Dyllick and Hockerts 2002), a point which has been reported by the UN Department of Economic and Social Affairs in their World Economic and Social Survey (2013) entitled *'Sustainable Development Challenges'.* Inequality is on the rise, and the various global crises make it all the harder to both effectively advance the sustainability agenda and secure genuine global co-operation and partnership on the key issues. The objective of the 2012 Conference was *"to secure renewed political commitment for sustainable development, assessing the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development and addressing new and emerging challenges"* (UN 2010, p. 4). One notable feature of the Earth Summits identified by Ferns and Amaeshi (2017) is how the role of business has evolved in policy discourse about sustainability. Although during the first Rio Earth Summit *'Corporations lined up to present themselves as part of the solution, rather than the problem'* (Ainger 2002, p. 21), they were subjected to considerable criticism (particularly from participating NGOs), and their role was largely undefined (Ferns and Amaeshi 2017). By the 2002 summit, the policy emphasised that the business sector was a key partner, and by the 2012 Rio Summit, business became framed as a key driver of progress towards sustainability (Ferns and Amaeshi 2017). Consequently, over the span of the last two decades it has become

evident that future policy initiatives on sustainability will require an ongoing interaction between governments and businesses.

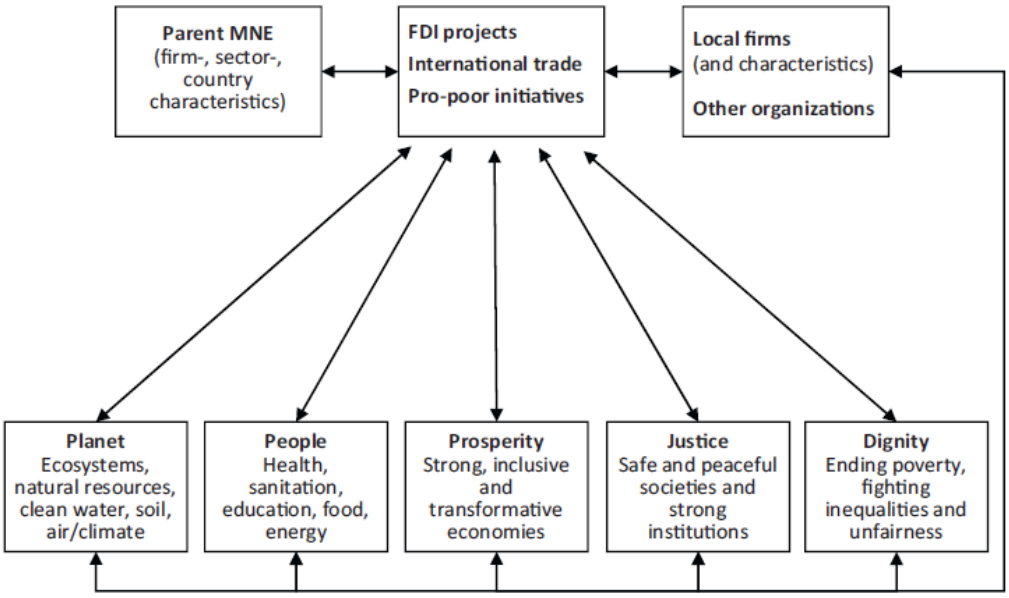
A further milestone is the 21st Conference of the Parties (COP) event held by the UN in Paris in 2015. COP21 helped to negotiate the Paris Agreement to address climate change, which represented a consensus of the representatives of the 196 parties in attendance (Sutter et al. 2015). In conjunction with other landmark events and reports, the COP21 helped to mainstream the sustainability agenda.

2.2.2 The Application of Sustainability: Management

As the sustainability agenda within policy has evolved from broad concepts such as development and economic growth towards changing production and consumption systems and reducing GHG emissions, businesses and management as a discipline have become more closely involved in sustainability debates. This is reflected in the emergent literature on sustainable business and management, as well as the abundance of disciplinary specific literature within fields such as operations, marketing and logistics (see Jennings and Zandbergen 1995; Shrivastava 1995; Starik and Rands 1995; Walker et al. 2015). Moreover, it has also become a specific field of study and practice for procurement.

At the business level, much of the discussion about sustainability has emerged alongside the longstanding topic of corporate social responsibility (CSR), and in the context of the socio-environmental impact of large, typically international, companies. The relevant literature in this field is effectively summarised in Kolk's (2016) paper *"The social responsibility of international business: From ethics and the environment to CSR and sustainable development"*, which provides a 50-year review of the field of CSR. From Kolk's (2016) perspective, companies utilise CSR as a pre-existing mechanism to make sense of, respond to, and accommodate the various challenges posed by SD. In doing so, one could argue that Kolk (2016) expands the concept of CSR with respect to the issues and stakeholders involved. Kolk (2016, p. 31) concludes his paper by presenting a preliminary model, which is displayed in Figure 2.1.

Figure 2.1. Multinational enterprises (MNEs) 'impact' on sustainable development[3]



Source: Kolk (2016, p. 31)

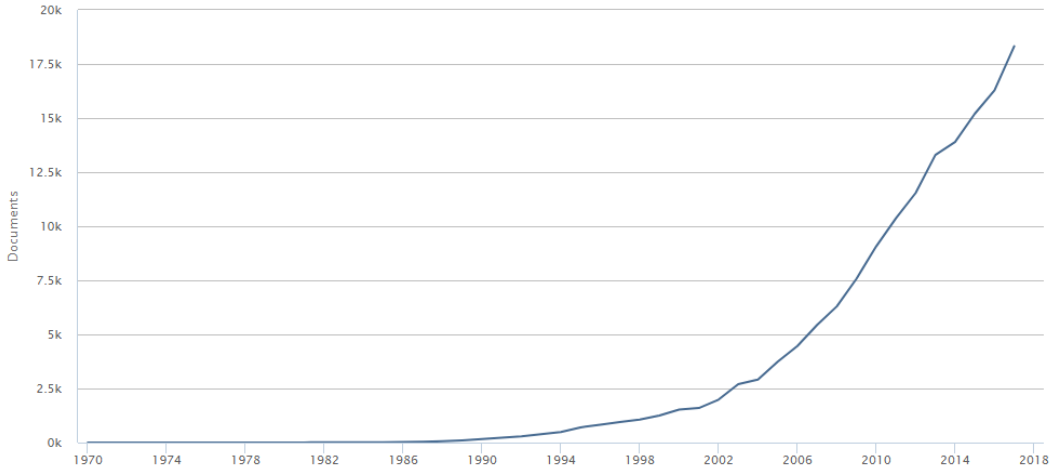
Figure 2.1 is expedient for illustrating both the breadth of the sustainability agenda (inclusive of topics such as human rights, health and poverty) and the interconnectivity of these issues for business. The model demonstrates that these large international firms can have a significant impact across the range of sustainability issues via their respective strategies and initiatives, investments and interactions with *'local'* firms that are ordinarily enacted through supply chains and procurement.

2.2.3 The Understanding of Sustainability: Scholarship

In the aftermath of the Brundtland Report, there was a rapid emergence of academic literature on sustainability, which can be illustrated by conducting a search using the term *'sustainability'* in the *'Title, abstract, keyword'* field within *'Scopus'*, a database of academic publications. Searching Scopus on 20th July 2018 produced 164,666 papers containing the term; the rate of growth in the usage of the term *'sustainability'* is illustrated in Figure 2.2.

[3] Preliminary framework for analysing multinational enterprises (MNEs) 'impact' on sustainable development

Figure 2.2. Sustainability papers by years



To understand the recent growth in sustainability scholarship, publications from 2010-2018 by individual years have been recorded in Figure 2.2

Table 2.2. Sustainability publications 2010-2018

Year	'Sustainability' Publications
2010	9,071
2011	10,367
2012	11,538
2013	13,295
2014	13,891
2015	15,199
2016	16,277
2017	18,317
2018 (01.01.18-20.07.18)	11,121

Figure 2.2 and Table 2.2 both illustrate that the use of the term 'sustainability' has rapidly increased in published academic papers, with a steep upward trajectory from the mid-1980s to present day. Walker and Brammer (2012) note that such a pattern of growth is relatively common with the advent of new theories and concepts. Walker and Brammer (2012) also correlated this growth in the last two decades with the expansion of the climate change debate (i.e. relating to a greater emphasis on environmental sustainability). This growth has coincided with a number of definitions being put forward. Along with the Brundtland Report (1987), Dr Gro Harlem Brundtland, chair of the World Commission on Environment and Development (WCED), put forward in Our Common Future (1987, p. 8) arguably the first and most cited definition of SD (see Berke and Conroy 2000, p. 22; Daly 1990, p. 1; Gladwins et

al. 1995, p. 876; Giddings et al. 2002, p. 188; Kates et al. 2005, p. 11; Mebratu 1998, p. 501; Sneddon et al. 2006, p. 254). Table 2.3 presents some of the notable definitions put forward by authors in the first two decades immediately following the seminal definition provided in the Brundtland Report (1987).

Table 2.3. Sustainability and Sustainable Development definitions

Author(s)	Year & page	Definitions
Brundtland	1987, p. 12	*"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their needs."*
Barbier	1987, p. 103	*"To maximize simultaneously the biological system goals (genetic diversity, resilience, biological productivity), economic system goals (satisfaction of basic needs, enhancement of equity, increasing useful goods and services), and social system goals (cultural diversity, institutional sustainability, social justice, participation)"*
Pearce et al.	1989, p. 1	*"Sustainable development involves devising a social and economic system, which ensures that these goals are sustained, i.e. that real incomes rise, that educational standards increase that the health of the nation improves, that the general quality of life is advanced."*
IUCN, UNEP and WWF.	1991, p. 10	*"Sustainable development, sustainable growth, and sustainable use have been used interchangeably, as if their meanings were the same. They are not. Sustainable growth is a contradiction in terms: nothing physical can grow indefinitely. Sustainable use is only applicable to renewable resources. Sustainable development is used in this strategy to mean: improving the quality of human life whilst living within the carrying capacity of the ecosystems"*
Costanza et al.	1991, p. 8	*"Sustainability is a relationship between dynamic human economic systems and larger dynamic, but normally slower-changing ecological systems, in which (a) human life can continue indefinitely, (b) human individuals can flourish, and (c) human cultures can develop; but in which effects of human activities remain within bounds, so as not to destroy the diversity, complexity, and function of the ecological life support system."*
Meadows et al.	1992, p. 209	*"A sustainable society is one that can persist over generations, one that is far-seeing enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support."*
Hawken	1993, p. 139	*"Sustainability is an economic state where the demands placed upon the environment by people and commerce can be met without reducing the capacity of the environment to provide for future generations. It can also be expressed as . . . leave the world better than you found it, take no more than you need, try not to harm life or the environment, and make amends if you do."*

Viederman	1994, p. 5	*"Sustainability seeks to ensure, to the degree possible, that present generations attain a high degree of economic security and can realize democracy and popular participation in control of their communities, while maintaining the integrity of the ecological systems upon which all life and all production depends, and while assuming responsibility to future generations to provide them with the where-with-all for their vision, hoping that they have the wisdom and intelligence to use what is provided in an appropriate manner."*
Hueting and Reijnders	1998, p. 139	*"Sustainability is defined as the use of the vital functions (possible uses) of our biophysical surroundings in such a way that they remain indefinitely available."*
Becker et al.	1999, p. 5	*"[S]ustainability imposes a strong commitment to action directed towards reshaping the relations between human beings and their environment, thus defining a strategic or political context. The main objective of this context is to renegotiate the goals of future societal development and to establish a system of governance that is able appropriately to implement policies moving towards sustainability on international, regional, national and local levels."*
Holling	2000, p. 399	*"Sustainability is the capacity to create, test, and maintain adaptive capability."*
Berke and Conroy	2000, p. 66	*"Sustainable development is a dynamic process in which communities anticipate and accommodate the needs of current and future generations in ways that reproduce and balance local social, economic, and ecological systems, and link local actions to global concerns."*
Folke et al.	2002, p. 437	*"The goal of sustainable development is to create and maintain prosperous social, economic, and ecological systems."*
Hopwood et al.	2005, p. 40	*"…sustainable development to describe attempts to combine concerns with the environment and socio-economic issues."*
Voinov and Farley	2007, p. 106	*"[sustainability] maintenance, sustenance or continuity of a certain resource, system, condition or relationship."*

Table 2.3 is not an exhaustive list of extant definitions but provides a snapshot of the plurality of definitions and how they have evolved over time. The definitions reviewed by Gladwin et al. (1995) served as a starting point from which to develop the summary of key definitions presented in the table. WCED's (1987) definition of SD attracted considerable criticism; indeed, Redclift (1987, p. 1) posited that it may be just "*another development truism*". Moreover, Middleton et al. (1993, p. 16) designate it as *'political fudge'*, arguing that its ambiguity was intended to secure widespread acceptance. Similarly, Gladwin et al. (1995) posit that restricting the definition during its embryonic stage could have potentially led to its rejection. Other commentators have acknowledged the relatively universal appeal of this definition, notably Lele (1991, p. 607), who explains that the wide ambit of Brundtland's definition *"allows people with hitherto irreconcilable positions in the environment development debate to search for common ground without appearing to compromise their*

positions." Daly (1990:1) also notes that *"To achieve this remarkable consensus, the Commission had to be less than rigorous in avoiding self-contradiction."* Lele (1991, p. 607), as part of a review on the growth of literature on sustainability, explains that there is *"a lack of consistency in its interpretation".* Holmberg (1994) reports that by 1994 there were more than 80 different definitions and interpretations available. Gladwin et al. (1995) and Hempel (1999) also draw attention to the existence of multiple definitions. Sustainability in the 1990s was referenced as being *'ambiguous'* by Wackernagel and Rees (1996), while Vos (1997) noted that it had been adopted as a broad slogan by the environmental movement. By 2006, the term sustainability had come to be regarded as *'complex'*, *'fuzzy'* and *'multifaceted'* (Gunder 2006; Wissenburg 2006).

Both Lee (2000) and Hansson (2010), whose work is separated by a decade, reported that, despite lengthy academic enquiries, a singular definition of *'sustainability'* did not yet exist, thus leaving sustainability a contested concept that was open to distinct subjective and disciplinary interpretations. Kates et al. (2005, p. 20) state that *"Since the Brundtland Commission first defined sustainable development, dozens, if not hundreds, of scholars and practitioners have articulated and promoted their own alternative definition; yet a clear, fixed, and immutable meaning remains elusive."* This argument is further supported by the work of Faber et al. (2009, p. 339), who similarly identify numerous definitions in their review of extant sustainability literature, and ultimately, conclude that sustainability and SD lack a universal definition. Therefore, as a concept, sustainability remains an open, '*dynamic*', '*malleable*' and '*evolving idea'* that can be adapted to fit very different situations and contexts across space and time (Kates et al. 2005, p. 20; Vos 2007, p. 338). An altogether more worrying development is the use of the concept, concerns the propensity for what Parr (2012) refers to as *'Hijacking'*. Parr's (2012) book *'Hijacking Sustainability'* outlines how sustainability, which originally emerged out of the environmental movement, has come to be widely used, misused and *'hijacked'* by businesses and other organisations, as well as being connected to other disciplines and alternative concepts. However contentious, it is important to choose a definition within a thesis and Berke and Conroy's (2000) definition is adopted from Table 2.3:

> *"Sustainable development is a dynamic process in which communities anticipate and accommodate the needs of current and future generations in ways that reproduce and balance local social, economic, and ecological systems, and link local actions to global concerns."*
>
> *Berke and Conroy (2000, p. 66)*

This definition acknowledges the present and future aspects of SD from a local level up to the international agenda. This definition ties in well with the scope of this thesis, which focuses on how sustainability in the Welsh context is aiding *'global concerns'*.

Sustainability versus SD

SD, the political and practical path towards sustainability, is a highly contested concept within academic inquiry, due partly to its wide-ranging meaning, as highlighted by Giddings et al. (2002), Lafferty and Langhelle (1999), Lafferty and Meadowcroft (2000), Lele (1991) and Redclift (1993). Part of the criticism of SD concerns the use of the term *'sustainable'* in conjunction with *'development'*. Theorists and practitioners have been grappling with the term *'development'* in the sustainability context for the best past of four decades (see Arndt 1981 and Bartelmus 1986, for semantic and conceptual histories of economic development), with numerous deconstructions of *'development'* being advanced (see Crush 1995; Ekins and Max-Neef 1992; Sachs 1995). Literally speaking, *'sustainable development'* means *"development that can be continued – either indefinitely or for the implicit time period of concern"* (Kates et al. 2005, p. 20).#This definition of development has been deemed oxymoronic, fundamentally contradictory and irreconcilable. Diesendorf (2000) proffers a solution to this problem by developing a more complex term: *'ecologically sustainable and socially equitable development'*.

Archetypes of Sustainability

Definitions of sustainability are often characterised in a dichotomous fashion as either: *'thick'* or *'thin'*; *'deep green'* vs. *'light green'*; *'hard'* vs. *'soft'*; *'strong'* vs. *'weak'*. Archetypes of sustainability (Vos 2007, p. 336) summarised as either *'Thin'* or *'Thick'* versions are displayed in Table 2.4.

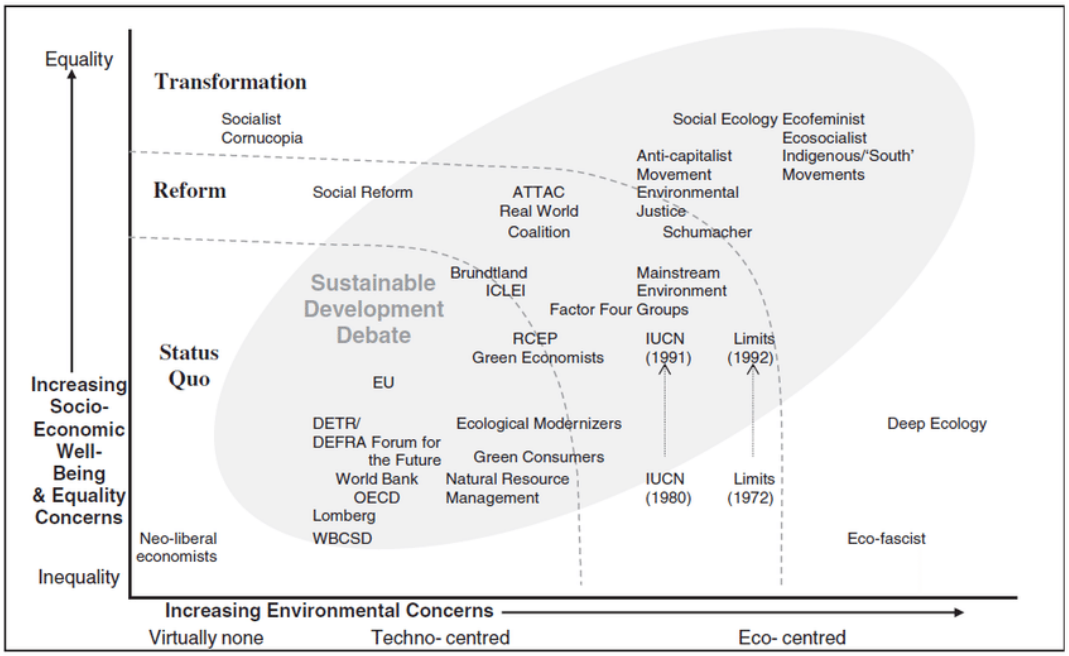
Table 2.4. Archetypes of sustainability

	Dominant paradigm	Thin versions	Thick versions
Ontology of nature	Nature as raw materials for the human economy.	Some intrinsic values recognized in nature.	Many intrinsic values recognized in nature.
Substitution for natural capital	Infinite substitution.	Some natural capital cannot be substituted.	No declines in natural capital.
Economic growth	No limits.	Win-win relationship emphasized.	Must slow and reverse growth.
Population growth	No limits.	Population growth must be accompanied by per capita offsets.	Must slow growth and achieve declining populations.
Role of technology	Technology rationality.	Cautious scepticism.	Deep scepticism.
Social equity	Left to the market.	Takes connections into account.	Attention to redistribution.
Stakeholder participation	Decisions by experts.	Collaborative stakeholder processes.	Grassroots democracy.

Source: Vos (2007, p. 336)

The notion of weak versus strong forms of sustainability is adopted by Hopwood et al. (2002) in an attempt to map different sustainability initiatives observed in their analyses. Their map, presented in Figure 2.3, plots initiatives according to the degree to which they focus on environmental protection and/or social equity and wellbeing, as well as the extent to which they either aim to preserve the current socio-economic status quo (i.e. are weak) or represent a radical challenge by attempting to transform the dominant social paradigm (strong).

Figure 2.3. Mapping of views of sustainable development



Source: Hopwood et al. (2005, p. 41)

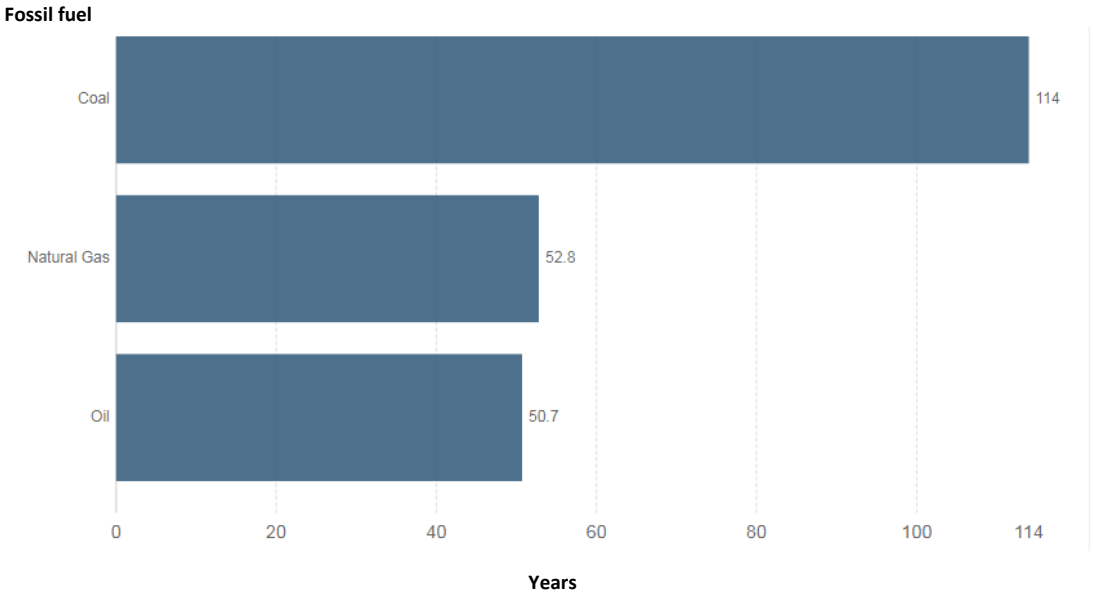
LCP as a sustainability initiative is primarily focused on environmental protection (although it also addresses the significant social justice implications of climate change) and can thus be situated within the status quo portion of the model, with an emphasis on ecological modernisation. LCP also forms a key component of the *'climate change'* and *'consumption and production'* discussion, which will now be discussed.

2.3 Climate change & consumption and production

It is now widely accepted and understood that human activities are reducing the long-term ability of the natural environment to provide goods and services and adversely affecting aspects of human health and well-being (Millennium Ecosystem Assessment 2005). Within the field of SD, the environmental impact of consumption and production systems is recognised as the main driver of unsustainability, whilst climate change (part of environmental sustainability) represents the most significant set of environmental, social and economic impacts linked to unsustainable development. Climate change and consumption and production were linked during the Earth Summit in Rio 1992, with the conference report recognised as a major catalyst in developing the field of SCP and in linking consumption and production to climate change (Murphy and Cohen 2001).

The potential impact from global temperature rises are addressed in the IPCC's fourth assessment report (IPCC 2007a). Future global warming is projected to have wide-ranging consequences, including sea level rises (IPCC 2007a), increased frequency and severity of extreme weather (International Energy Agency 2012), and loss of biodiversity, with detrimental effects for both ecosystems and the livelihood of global citizens (Mora et al. 2013). To avoid these effects, there is a need to reduce global GHG emissions and stabilise the global level of GHG. The primary source of carbon emissions is connected with human activity concerns the burning of fossil fuels like coal, natural gas, and petroleum for electricity and heat (UN 2018; United States Environmental Protection Agency 2018). The International Energy Agency (2012) reported that between the period of 1870-2011 nearly two thirds of all fossil fuel had been used (1900 $GtCO_2$), leaving roughly one third remaining (1000 $GtCO_2$). More recently, a BP Statistical Review of World Energy (2016) estimated how many years supply of global coal, oil and natural gas were left known as *'reserves'*, all of which are presented in Figure 2.4.

Figure 2.4. Years of fossil fuel reserves left presented in years



Source: BP Statistical Review of World Energy (2016)

Figure 2.4, predicts that the world has approximately 114 years of coal production and about 50 years of both oil and natural gas remaining. Understanding and reducing humanity's carbon footprint is the most critical step we can take to end *'ecological overshoot'* and live within the means of our planet (Global Footprint Network 2015). A host of literature addresses the necessity of urgently reducing consumption of fossil fuels (see, for example,

Ayers and Dodman 2010; England 1994; Heinberg 2006), and, indeed, climate change and carbon reduction have arguably become the dominant theme in sustainability discourses. In the UK context, Porritt (2009, p. 17) notes that "*In many respects, climate change has been used by this Government as the "next best proxy" for full-on sustainable development*".

The following extract represents the author's contemporaneous diary entry from 15 December 2015:

Diary: The environmental 'problem'

15 December 2015

Today is one of many days in which I have left Ken's office. We spoke about the scope and direction of the research at this initial stage. Ken noted that when people think about sustainability they invariably talk about climate change and pollution, referring either to the environmental 'problem' or environmental 'issue'. This was not the first or last time that we would discuss this. Indeed, Ken would routinely state that the "Environment doesn't have a problem, it just is". Over the course of this year, this statement would remain with me.

Upon reflection, I had not fully grasped the notion that environmental 'issues' and 'problems' are man-made, and that, ultimately, it is up to society to understand and acknowledge that we are the problem, that we have a problem, and that it is our responsibility to remedy this problem. Perhaps this is an example of deep-rooted ecology, but the more I think about it the more that I view this relationship as being akin to the relationships that we have with other humans. That is to say, in the same way that other humans existed prior to us coming along, so the environment was there before we came along. We embarked on our whirlwind romance with the environment. We then started to take the environment for granted. We took from the environment as if it is was our possession. Finally, our expectations and demands in this relationship went far beyond what the environment could bare. Now, we must learn to respect the environment and nurture our relationship with the environment. Though we may not speak the same language, the environment is conversing with us through the unprecedented acts of climate change, which is a language we should be able to understand.

The act of *'procurement'* is central to the theme of SCP (Porritt 2009), as produced and consumed products and services are procured by individuals or organisations and, therefore provides a potentially effective lever for pro-sustainability action. Consumption and production are intimately related topics, with procurement as key mechanism connecting

them. Authors such as Drumwright (1994), Lamming and Hampson (1996) and Oruezabala and Rico (2012, p. 574) have all called for the use of procurement to achieve greater sustainability. Procurement is often referred to by different terms, such as purchasing, procurement and buying. It is important to note here that the term *'procurement'* is not a point of contention and is best considered more as a function (Chicksand et al. 2012). A simple definition of procurement is provided by the New Economic Foundation (2005, p. 4): *"Procurement, generally characterized as purchasing, by private or public organizations is broadly defined as the act of obtaining goods and/or services."* Within the UK, the Stern Review brought together concerns over climate change and the need to take urgent action through procurement. The following section provides a brief discussion of the Stern Review and the actions following its publication.

2.3.1 Stern Review

Sir Nicolas Stern, Head of the UK's Government Economic Service and former Chief Economist of the World Bank, released his Review of the Economics of Climate Change to the UK government in October 2006 (later published as a report in 2007 by Cambridge University Press). This review was recognised as a key turning point in the UK climate change debate (Osborne 2006; Lawn 2016). Tony Blair, then Prime Minister of the British government, presented the comprehensive Stern Review, noting that:

> *"It is not in doubt that if the science is right, the consequences for our planet are literally disastrous… [W]ithout radical international measures to reduce carbon emission within the next 10 to 15 years, there is compelling evidence to suggest we might lose the chance to control temperature rise" (Blair 2006, p. 1).*

Stern (2006) considered climate change to be the biggest market failure ever witnessed, presenting a key challenge for economics. Stern further elaborated that the cost of the related damage to the global economy had been radically underestimated, whilst the cost of emission reductions had been over-estimated. Stern noted:

> *"There is now clear scientific evidence that emissions from economic activity…are causing changes to the Earth's climate." (Stern 2006, p. 1).*

The nearly 700-page review is regarded as *"comprehensive in its scope and ambitious in its aims, with an attractive multi-coloured visual design that makes topics like cost-benefit analysis of dynamic externalities look almost glamourous"* (Weitzman 2007, p. 703). Half of the review focuses on the impacts and risks arising from uncontrolled climate change, as well as the potential cost and opportunities associated with the action required to effectively tackle it. The latter half examines the national and international policy challenges of transitioning to a low carbon economy. A running theme throughout the review is the need to inform, educate and persuade individuals about what they can do to respond to climate change. The review places policy decisions about how best to balance emission reductions with climate damages within the framework of economic growth theory (Nordhaus 2007, p. 690) and calls for immediate decisive action to be taken to stabilise GHG, because there are clear benefits deriving from strong, early action which far outweigh the potential costs:

> *"If no action is taken to control emissions, each tonne of CO2 emitted is causing damage worth at least $85 but these costs do not include investor and consumer decision making about how they spend their month." (Stern Review 2007, p. xvi)*

However, there are both practical and political implications involved with taking meaningful action. Weitzman (2007, p. 702) argues that *"To accomplish the Review's ambitious goal, greenhouse gas emissions would need to be progressively reduced by 3% each year, beginning more or less immediately."* Dasgupta (2007) notes that Stern's review has important implications for debates around consumption and production, and that the potential leveraging power of public procurement as a policy tool is a recurring theme throughout the review:

> *"Public procurement could be a useful vehicle for highlighting best practice in incorporating adaptation in investment decisions – and may also drive forward demand for adaptation services to help guide private sector decisions." (Stern review 2006, p. 421)*

> *"Government's own long-term polices for climate-sensitive public goods, such as natural resources protection, coastal protection, and emergency preparedness, should take account of climate change to control future costs (Box 19.3)." (Stern Review 2006, p. 422)*

These two statements highlight how procurement can be used as a key part of the adaption process and policy changes required to tackle climate change. Following on from 2007, the

UK introduced the Climate Change Act (2008) that set legally binding targets for the UK to reduce current emissions by at least 80% (from 1990 baseline) by 2050, representing *"the world's first long-term legally binding framework to tackle the dangers of climate change"* (Department of Energy and Climate Change (DECC) 2008).

Using public procurement as a policy tool is not a new phenomenon (see Parikka-Alhola 2008; Rolfham 2009). The escalating deterioration of the environment outlined in the aforementioned international and national summits and reports has led governments in recent years to make increased use of their procurement powers as an environmental protection tool (Clement 2007). Following the Stern review, UK public sector procurement has increasingly been used to pursue a sustainability agenda and is widely regarded as one of the most effective mechanisms through which governments can drive policies such as the low carbon agenda (Correia et al. 2013). As shown in Table 2.5, scholars have identified three key reasons for its potential effectiveness: public expenditure, display of leadership, and influence on other sectors and innovation whose importance can be summarised as follows:

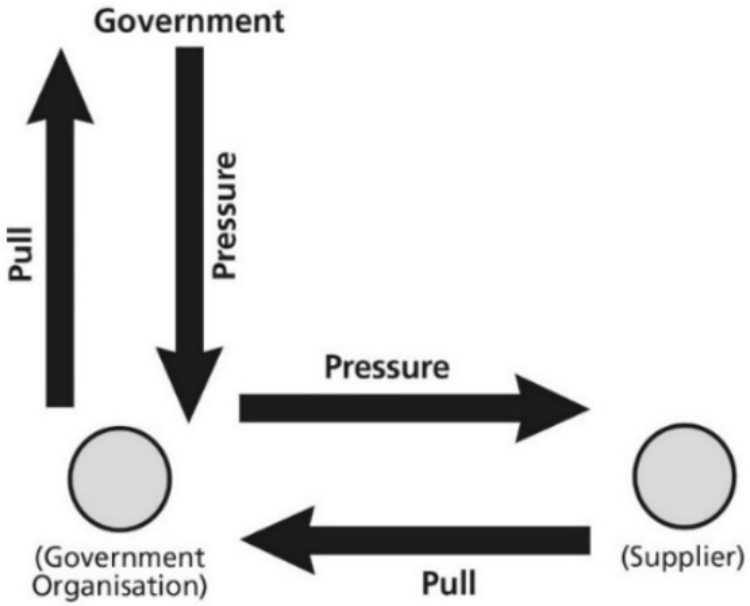
Table 2.5. Reasons for use of Sustainable Public Procurement (SPP)

Reason	Authors
Expenditure	Afonso et al. (2005); Brulhart and Trionfetti (2004); CEC (2008); European Commission (EC) (2003a); EC (2003b); EC (2004); EC (2006); Fernandez-Martin (1996); Ho et al. (2010); McCrudden (2004); Michesen and de Boer (2009); OECD (2000); OECD (2002); Tarantini (2011); Trionfetti (2000); Walker and Brammer (2009).
Leadership	Brander et al. (2003); Carlsson and Waara (2007); Clement (2007); Erdmenger (2003a); EC (2004); Ho et al. (2010); Kunzlik (2003); Li and Geiser (2005); Michelsen et al. (2006); Michelsen and de Boer (2009); Preuss (2007); Steurer (2012); Testa et al. (2012); Walker and Brammer (2009); Walker and Brammer (2012).
Influence	Aschhoff and Sofka (2008); Cerin (2006); Ceschin and Vezzoli (2010); Edler and Georghiou (2007); Edquist et al. (2000); Erdmenger (2003b); Gunther and Scheibe (2006); Ho et al. (2010); McCrudden (2004); Parikka-Alhola (2008); Parikka-Alhola (2009); Rolfham (2009); Tarantini et al. (2011); Walker and Brammer (2009); Walker and Brammer (2012); Weiss and Thurbon (2006).

Firstly, procurement spend is referred to by authors partly to justify focusing on the public sector. The OECD (2006) explains that *"Government organisations across the world tend to spend between 8% and 25% of GDP on goods and services."* Annually, public authorities in the EU spend approximately the equivalent of 16% on the EU Gross Domestic products and services (see CEC 2008; EC 2008; Ho et al. 2010 and Rolfham 2009). Secondly, within the public sector it is often expected that public authorities act as leaders (Ho et al. 2010) and so

must perform the dual role of implementing legislation and policy (Walker and Brammer 2009) and responding to pressure to display leadership (Brammer and Walker 2011; McCrudden 2004). By carrying out their own purchasing processes sustainably, governmental agencies can gain first-hand experience in the implementation of sustainability within public procurement activities (Li and Geiser 2010). Finally, there are authors who identify the power public sector procurement has through the *'pressure'* and *'pull'* (depicted in Figure 2.5), which influences suppliers to deliver sustainability through products and services, and, thus, achieve the government's policy agenda (see Parikka-Alhola 2009; Walker and Brammer 2009; 2012). Rolfham (2009) further explains that the public sector has purchasing power, if directed wisely, could boost supplier-side innovation. This would result in suppliers and government organisations being prompted to seek to deliver sustainability through procurement.

Figure 2.5. Pressure and pull through procurement



Source: Author

Figure 2.5 demonstrates how governments can, via policies, put pressure on their own purchasing departments to purchase more sustainably. In turn, government procurers then put pressure on their suppliers to support their sustainability practices. In the event of sustainable products and services not yet being available, the hope here is that this would inspire supplier innovation to take place (Rolfham 2009).

2.4 Summary and Conclusion

This chapter reviews the evolution of the concept of sustainability. This involved an initial review of its emergence within public policy, its application in the management sphere, and its varied conceptualisations within academic inquiry. The chapter identifies sustainability and its direct correlation to environmental factors and more specifically, recent concerns of increase in carbon and climate change which cascades interest into this area. Later in the chapter critical milestones in national and international policy were discussed, in conjunction with acknowledging debates pertaining to the definition of sustainability. After outlining the definitions, a definition of sustainable development was selected for this thesis. The chapter then proceeded to firstly examine the connection between climate change and consumption and production, before outlining how the act of public procurement can serve as a lever for sustainability as originally noted in the Stern Review (2006).

This chapters posits the importance that public procurement has as a key factor to support sustainability and more specifically the reduction of carbon, as carbon forms an integral part of the climate change discussion within the sphere of environmental sustainability. Though there are different avenues to explore sustainability, importance is placed upon public sector procurement and in particular three key elements; '*leadership*', '*expenditure*' and '*innovation*'. Having identified the importance of public sector procurement pertaining to SD, the following chapter examines SD in the contextual framework of Wales, showcasing Wales as a unique research site due to its industrial heritage and recent constitutional commitment to implement SD.

3 Sustainable Development in Wales

3.1 Introduction

This chapter focuses on SD within Wales. Following the Government of Wales Act 1998, Wales became one of the first few places in the world to embed a duty to SD within its constitution (Munday and Roberts 2006; Peattie 2005b; Williams 2006). The chapter is divided into two sections and seeks to explore why Wales is a pertinent location for the present research. The first part provides an historical overview of Wales with especial focus on the industrial revolution and carbon intensive activities subsequent to industrialisation, before proceeding to review recent SD policy initiatives. The second part of the chapter examines the recent carbon increases in Wales and discusses the link to industrial activity, which formed the basis for the preliminary research (Cycle One). The chapter then discusses Cycle One, which explores how carbon is considered within procurement process across various sectors and how its findings underpin the larger research project which focuses specifically on the public sector.

To provide a comprehensive review of SD in Wales a range of sources have been used, including legislation, academic papers and governmental reports. Key contributions come from Peattie (2005a; 2005b) through two SD leadership reports, as well contribution from the UK government's Department of Environment, Food and Rural Affairs, National Assembly for Wales (NAW), Welsh Assembly Government (WAG)[4], CCCW, and Committee on Climate Change (CCC) in the UK in the form of official reports and releases.

3.2 Overview of Wales

As a member state of the UK, Wales does not have its own currency and distinctive majority language, which are two key criteria for nationhood (Berdichevsky 2004). However, since 1999, Wales has had its own devolved government and can formulate many of its own laws, which represents another key marker of nationhood (Berdichevsky 2004). Consequently, there has been a renewed sense of nationalism within Wales over the last two decades. Wales spans across a total area of 20,778 km^2 (8,030 square miles) and borders England, which lies to its east (Davis 2007) see Figure 3.1.

[4] Welsh Assembly Government (WAG) is now also recognised by the name Welsh Government (WG)

Figure 3.1. Location of Wales

Wales is home to 3,063,456 people and is the third most populous state in the UK (StatsWales 2016). The most populated cities in Wales are Cardiff (Population: 302,139), Swansea (Population: 170,883), Newport (Population: 117,326), Rhondda (Population: 59,450) and Barry (Population: 51,681), all located in South Wales (StatsWales 2016). To understand Wales' relationship with carbon, it is vital to examine its industrial heritage.

3.3 Industrial heritage: reality and rhetoric of Wales

Wales is recognised for its rural landscape, mountainous terrain and rugged coastline, which simultaneously provide significant economic opportunities through tourism and emphasise the importance of SD for the region (Owen et al. 1993). Wales has over 2,700 km of coastline and is predominantly mountainous, with its highest peaks being in the north and central areas, including Snowdon (Yr Wyddfa) which is its highest summit. Wales' industrial heritage forms an integral component of its environmental history; it's historical association with carbon intensive industries and the concomitant negative externalities of derelict and contaminated land and post-industrial community deprivation, have impacted on the region's image and perceived attractiveness (Owen et al. 1993). In this respect, the industrial

revolution proved to be a pivotal point not only for Welsh history, but also in terms of the global balance between the world's population and the natural environment (Peattie 2005b).

Table 3.1 depicts a chronological overview of key events obtained from numerous sources including the British Broadcasting Corporation (BBC) (2015), government reports (see Peattie 2005a; 2005b), WAG and NAW reports. More specifically, Table 3.1 traces the evolution of SD in Wales across time, from the beginning of the Industrial Revolution up to present day.

Table 3.1. Industrial Revolution in Wales to date

Date/ Period	Activity
1760	Industrial Revolution begins. Rapid industrialisation and increase in population in South Wales.
1801–1900	Distinctive Welsh politics developed in the 19th century.
1820-1840	Industrial Revolution comes to an end during this period.
1839	Bute Dock is built in Cardiff to supply vast amounts of coal to the world, resulting in significant population growth and rise in economic prosperity in Wales
1840	Spread of coal mining to Cynon and Rhondda valleys located in the south.
1905	Cardiff is elevated to city status. Population increases. Wales is a key contributor to the industrial revolution through mining and plays an integral role in the First World War through producing steamships (including battleships for the Royal Navy)
1911	Population of Wales 2,421,000 (doubled since 1851) because of the coal mining districts.
1916	David Lloyd George becomes the first Welsh Prime Minister of the UK. The only Prime Minister to speak English as a second language, as Welsh was his first.
1925	Formation of Plaid Cymru (political party) with initial slow growth.
1940	Labour Party replaces the Liberal party as the dominant political force during 1940.
1945	Wales played a considerable role during the second world war. The inter-war period and post-war period brought hard times for Wales, with a faltering economy and profound sense of insecurity.
1946	Welshmen James Griffiths and Anwurin Bevan spearheaded the National Insurance Act 1946, which set up the National Health Service (NHS).
1945	The coal industry steadily declined after 1945.
1955	Cardiff is officially declared capital of Wales in 1955. Cardiff is currently one of Europe's youngest capital cities.
1960	The national party Plaid Cymru gained short-lived momentum in the 1960s.
1980	The coal mine closure hits South Wales during Thatcher's tenure in government.
1990	By the early 1990s, there was only one deep pit operating in Wales and there was a decline in the steel industry (the steel crisis). The Welsh economy become increasingly based on expanding the service sector.
1996	The Senedd, the NAW building opens.
1997	In a referendum in May 1997, the Welsh public votes yes to establish the NAW, which would establish devolved powers in key areas.
1999	The NAW is officially set up and opened by her Majesty the Queen under the Government of Wales Act 1998. The NAW is responsible for a range of devolved

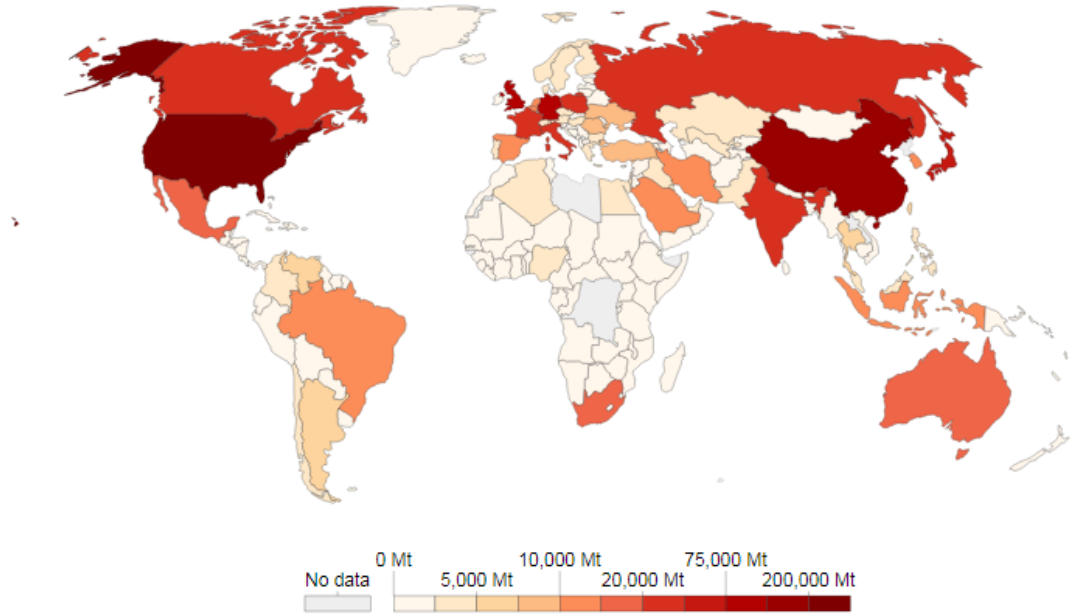
	policy matters. The duty to pursue SD across all elements of government forms part of the foundation of the constitution of Wales.
2002	Formation of Cynnal Cymru also known as Sustain Wales (SW), the SD Forum for Wales.
2002	Formation of Value Wales (VW), a government department, to instil sustainable public values in public procurement activity.
2006	Government of Wales Act 2006 enacted. The new arrangements provided for in the Act created a formal legal separation between the NAW and the WAG, afforded the Assembly law-making powers in Schedule 5 of the Act.
2007	The UK, including Wales, goes into deep recession in the aftermath of the financial crisis.
2007	Formation of the CCCW.
2010	Wales is fragile and reliant on key areas, such as procurement, tourism, etc.
2011	A successful referendum extends the law-making powers of the NAW, granting it power to make laws, known as the Acts of Assembly on all devolved matters, without requiring the UK Parliament's agreement.
2012	VW launches the sustainable public procurement policy.
2014	UK GHG inventories completed. Report released in 2015.
2015	Well-being of Future Generations (Wales) Act 2015 is established and enacted in 2016.
2016	Environment (Wales) Act 2016 enacted
2016	Closure of the CCCW.
2016	Formation of the Future Generations Commissioner's office
2016	Potential closure of Port Talbot steelworks.
2016	In a UK Referendum (Brexit) the general public voted to leave the EU.
2017	Well-being of Wales 2016-17, first report released in September 2017. It provides narratives on progress towards the goals and data for the national indicators.
2018	NHS celebrates its 70th birthday on 5th of July 2018 in the midst of concerns over its long-term sustainability.

In the pre-industrial period, the Welsh economy (like others) was predominantly agricultural, with the production of goods and provision of services largely undertaken on a *'craft'* scale for primarily localised consumption, with only some regional and international trade (Peattie 2005b). Although, human activity had impacted upon the environment for thousands of years, peoples' work and lifestyles during this period reflected their natural environment and their relationship to natural systems (Peattie 2005a).

With the advent of the Industrial Revolution, livelihoods, lifestyles and vast areas of the landscape were transformed by the adoption of new modes of manufacturing and technologies, and the resources needed to power them. Originating in the UK, the Industrial Revolution took hold in different countries during different periods; in Wales, the period from 1760 to somewhere between 1820 and 1840 represented a key turning point in terms of industrialisation and the production of carbon (Davies 2007). Appendix A, holds Carbon Dioxide Information Analysis Centre (CDIAC) data, illustrating cumulative carbon emissions

on a map of the world, through snapshots on different dates, from 1751 to 2014. A final image presented in Figure 3.2.

Figure 3.2. Cumulative CO_2 emissions 2014



Cumulative carbon dioxide (CO_2) emissions represents the total sum of CO_2 emissions and is measured in million tonnes.

The emergence of the Industrial Revolution in Wales and the concomitant development of the mining and metallurgical industries transformed the country from an agricultural society into an industrial nation, as the South Wales' coalfields caused a rapid expansion of Wales' population (University College of Swansea 1970; Office of National Statistics 2001). Through industrial investments, such as coal mines and steelworks, Wales became a major contributor to British industrialisation. During the rise of the British Empire in the 19th century, South Wales experienced rapid industrialisation and a population boom (Davies 2007).

3.3.1 Population

In 1801 Wales' population was 587,128, whereas by 1901 this increased to over 2,012,876 (Office for National Statistics 2001). This near four-fold increase was partly to support the coal and iron industries spreading throughout the Cynon and Rhondda Valleys. Ten percent of the Welsh population worked in the mines by 1921 (Merrill and Kitson 2017).

3.3.2 Industry

By 1827 the South Wales iron industry accounted for half of Britain's iron export (Jones 2014). This generated a corresponding growth in coal production, as, at least initially, the coal industry served the iron industry. During the 1880s, Cardiff docks were exporting almost nine million tonnes of coal annually, making it the global energy capital of the period (Merrill and Kitson 2017). Figure 3.3 presents a visual illustration of a Welsh coal mine from Merrill and Kitson (2017, p. 25). The quality of Welsh coal for domestic heating and producing steam for the railways and steamships was acclaimed, resulting in increasing exploitation of coal reserves, particularly in the central Rhondda valleys (Davies 2015). By 1891, 30 million tonnes of coal were mined in South Wales, rising to 57 million tonnes by 1913 (Jones 2014), which accounted for one fifth of British coal production, and provided employment for over a quarter of a million miners (Merrill and Kitson 2017). Around 57 million tonnes of coal were produced in 1913, as 232,000 men worked in 620 mines across Wales (BBC 2008; Welsh Government 1985). This is illustrated in Figure 3.4.

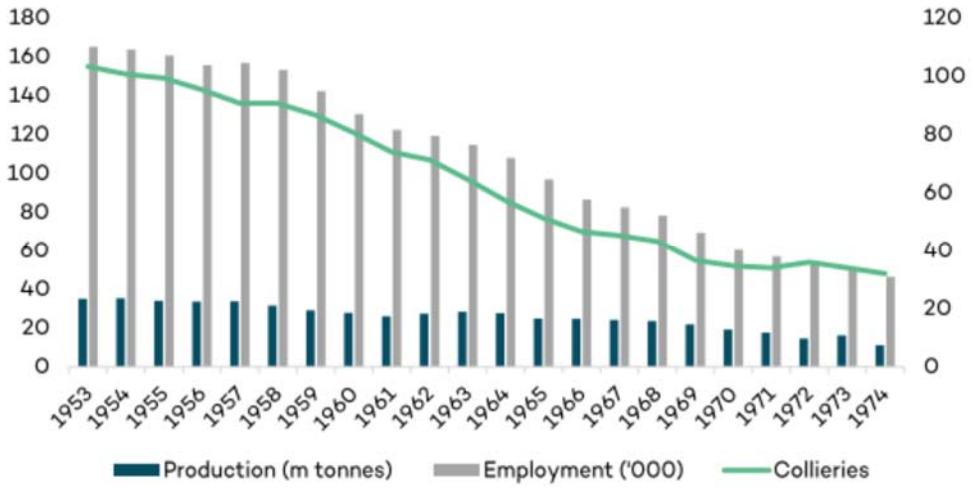
Figure 3.3. Example of a Welsh mine

Figure 3.4. Output and employment in Mining (All Wales, 1874-1975)

Source: Welsh Government (1985)

The Industrial Revolution placed the green and peaceful valleys of South Wales, centre-stage in the economic development of Britain. By 1905 Wales' standing was high due to it being a key driver of both the British and global economy and its integral role in the Industrial Revolution. Although mining unquestionably created economic prosperity within Wales, it also engendered significant social and environmental costs, including increasing carbon emissions. Moreover, the use of coal raised more immediate, practical problems such as earth moving, mine construction, water pumping, transport, and controlled combustion (Mebratu 1998). The Welsh experience of a century ago demonstrates to how the exploitation of both natural resources and people for economic gain creates significant social and environmental instabilities. The emphasis on coal and steel in Wales also subsequently underlined the fundamental interrelationship between economic activity, social welfare and environmental quality, in that a mining investment is an unusually unsustainable type of economic development because once a mine is physically exhausted, no amount of social or financial capital investment will allow it to continue (Peattie 2005b). Over the course of the 20th century, there was a marked shift away from industrial activity in Wales through the closure of most mines, accelerated by a further drop in demand precipitated by the discovery of North Sea oil (Merrill and Kitson 2017), which culminated in some of the most difficult social and economic challenges that Wales has had to face in recent decades (Mccrum 2014). Research by the BBC in 2008 into Welsh history noted that by 1936 South Wales had closed 241 mines. The rise of the oil industry and other factors meant that 50 collieries closed in South Wales between 1957 and 1964. Welsh Government statistics presented in Figure 3.5. outline mining production, employment and collieries in South Wales that were open between 1953-1974.

Figure 3.5. Production, employment and number of Collieries in South Wales (1953–74)



Source: Welsh Government (1985)

By the 1980s, little remained of the coal industry in Wales (BBC 2008). The government accepted a commission report to close 27 of the remaining 33 collieries in South Wales and put an embargo on hiring (Gudgin 1984) and job losses. Male job losses illustrate to this drastic decline; by 1981 there were only 28,400 men working in Welsh Coal mines, by 2004, there was further 90% reduction (against 1981 figure) in the numbers working in the industry (Beatty et al. 2007). In March 1984, the National Union of Miners, confronted with the end of coal mining in Britain, called a national strike to secure the future of the industry. Confrontations on picket lines became violently ugly (Phillips 2016). Coon (2017) reports that on 18 June 1984 there was a violent confrontation called *"The Battle of Orgreave"* between police and picketers at the British Steel Corporation (BSC) coking plant in Orgreave, England. These clashes are captured in Figure 3.6 below.

Figure 3.6. The battle of Orgreave

Source: Coon (2017)

This comprised of 6,500 miners, 1,000 of whom were from South Wales, clashing with 4,000 police in a brutal and uncontrolled brawl, as the violence reached levels that were unprecedented in the UK's industrial history (National Coal Museum 2009).

3.4 Sustainable Development

The 1980s also signalled the emergence of SD within the business sector and its political mainstreaming in the aftermath of the Brundtland report in 1987 (Ferns and Amaeshi 2017). SD proffered an understanding of how the elements environment, society and economic activity were inter-twined and interdependent, and highlighted the urgent need to secure an equilibrium between the three elements (Peattie 2005b). SD was deemed as having the potential to secure within Wales a greater sense of harmony and balance between its people, its economy and its natural environment (Munday and Roberts 1993; Owen et al. 1993; Williams 2006).

Today, Wales' economy is predominantly dependent on the public sector, light and service industries and tourism (NAW 2011). The traditional extractive and heavy industries that once characterised Wales have invariably vanished or are in rapid decline (Jennings and Roy 2011). Elements of traditional carbon intensive industries do remain and are important to specific local economies, as evidenced by the controversy over the potential closure of Tata Port Talbot steelworks in 2016. This underscores the grim reality facing Wales (Tovey 2016), as the potential loss of the Tata Port Talbot steelworks would have resulted in 15,000 jobs being lost (BBC 2016).

In 2016, Wales' gross value added (GVA) was £59.6 billion, which is £19,200 per head, and the lowest GVA per head in Britain (National Welsh Government 2017). Wales, once a pioneer in industry and innovation, has been left vulnerable in terms of its economy due to the decline in industry (BBC 2016). The introduction of SD as a policy framework for Wales via the Government of Wales Act (1998), Section 121, represented, in part, the necessity for a foundation mechanism to provide future prosperity and stability for Wales.

With the introduction of the Government of Wales Act 1998, the Welsh Government became one of the first institutions that sought to translate SD from an academic concept and political aspiration into a practical and operational reality in terms of the governance and management of a region and its policy agenda (Peattie 2005b). With the creation of the NAW, SD was established as one of the three guiding principles, although one could argue that the other two, equal opportunities and social inclusion, also form an integral component of the social justice dimension of the SD agenda. Wales continues to lack complete autonomy to make legislative and policy changes. To fully understand the changes in the post-2000 Welsh legislative framework, it is important to consider the shift in the political landscape in 1997, following a labour government manifesto pledge for a referendum, which led to the Welsh people voting *'Yes'* by a margin of 50.3% to 49.7 (Dewdney 1997), and thus bringing into being a devolution of powers from Westminster and the creation of a NAW. Within a year the Government of Wales Act 1998 was passed, and her Majesty the Queen officially opened the NAW. The Act established the NAW as a corporate body, with the executive (the government) and the legislature (the Assembly itself) operating as one (National Welsh Assembly 2017). This change in legislation granted Wales greater power, allowing Wales to become a distinct constitutional entity within the UK for the first time in 40 years via the transferring of all powers from the Secretary of State for Wales to the new Assembly.

Whilst the NAW initially lacked the authority to implement primary legislation, this changed with the passing of the Government of Wales Act 2006. The new arrangements outlined in the Government of Wales Act 2006 instantiated a formal legal separation between the NAW, comprising of 60 assembly members, and the WAG, comprising of the First Minister, Welsh ministers, deputy ministers and the counsel general. This separation between the two bodies took effect on 3 May 2007. The separation was meant to clarify the respective roles of the Assembly and the Government. Whilst the NAW makes laws and represents the interests of the people of Wales, the role of the WAG is to make decisions, develop and implement policy, exercise executive functions and make statutory instruments. The 60 Assembly members in the NAW scrutinise the Welsh Government's decisions and policies, hold ministers to account, approve budgets for the Welsh Government's programmes, and possess the power to enact Assembly measures on specific matters. The Government of Wales Act 2006 provided the Assembly with law-making powers across 20 *'Fields'* and *'Matters'* listed under Schedule 5 of the Act as '*Assembly Measures'*, including public procurement. Following a further Welsh Referendum in 2011, additional powers were granted that enabled the Assembly to legislate and now pass Acts without consultation with the UK parliament, over the 20 devolved fields. The Welsh Assembly is now capable of amending any of these matters, which are routinely modified and updated. The next section focuses on SD and its integration within legislation and policies in Wales.

3.4.1 The evolution of regulatory and policy duties towards sustainability

The requirement that the WAG must promote SD in the exercising of all its functions is based upon the Assembly's duty under Section 121 of the Government of Wales Act 1998 (chapter 38). The Act requires that the WAG prepare a scheme that considers and promotes SD across all aspects of its operations, in conjunction with developing, reviewing and reporting on this scheme, so as to integrate the principles of sustainability throughout its policy making agenda. WAG is also legally bound to set specific targets for SD and to develop indicators that will assist in the evaluation of related activities and policies (Munday and Roberts 2006).

WAG produced its first SD Scheme '*Learning to Live Differently'* in 2000, followed by its '*Plan for Wales 2001'* (WAG's Strategic Plan) that sought to establish SD. The scheme had six broad SD policy objectives that are outlined below:

- The environment should be cherished and protected so that it remains healthy and biologically diverse, and can continue to support us all

- Development of a self-sustaining economy that respects the environmental and social context of Wales and responds to SD opportunities
- Engage in action to make our communities strong and viable, and encourage people to be healthier
- Enable people to play a part in the decision-making process on issues that affect them
- Recognise the distinct needs of all parts of Wales
- To make Wales contribute to SD at both a global and local level

In August 2001, the NAW published '*Climate Change Wales: Learning to Live Differently*', which committed Wales to reducing carbon emissions in compliance with the Kyoto agreement (Peattie 2005b). WAG also established Cynnal Cymru, also known as Sustain Wales (The Sustainable Development Forum for Wales), during 2002 to provide advice and an evidence-base to support SD policy making, as well as acting as a *'critical friend'* and *'network of networks'* to assist with processes of consultation and policy execution, particularly in respect to civil society organisations. A host of other structural developments have subsequently emerged to support SD policy development and implementation, including: the WAG and the Welsh Local Government Association publishing a Joint Compact committing them to promoting SD; national NGOs such as Oxfam and the World Wide Fund for Nature (WWF) setting up Welsh agencies; and local government SD coordinators forming a national network (Williams 2006). The delivery of SD policy has rapidly evolved from a small dedicated staff based in WAGs Environment Division to become a central strategic policy unit at the corporate centre, with a cross-cutting agenda affecting the activities of all departments (Williams 2006). Despite the undoubtedly pioneering policy work conducted by WAG, Munday and Roberts (2006) argue that these outcomes invariably reflect a *"weak"* sustainability position, that assumes progress in well-being and environmental quality can be pursued within the same policy framework without compromise, by allowing human-made capital to substitute for environmental capital. This is in contradistinction to a *"strong"* notion of sustainability that emphasises the need to maintain environmental quality and a given stock of natural assets.

In 2003, WAG considered one internal and two external evaluation studies on the effectiveness of their SD scheme, resulting in a revised scheme and a new Action Plan for 2004–2007. Although the revised scheme generally continued in the same vein as the

previous ones, it did place a significantly greater emphasis on converting strategic ambitions into effective policies across a wide range of areas, and stressed the importance of partnerships with other stakeholders, such as local government (Williams 2006). In 2004, a new strategy '*Wales: A better Country'* was introduced. In light of this, a new scheme for SD was published in a SD action plan entitled *'Starting to live differently'.* This complemented 2005's *'One future – different paths'*, the UK's shared framework for SD to 2020, which put forward the following shared vision of SD:

> *"The goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations……for the UK Government and the Devolved Administrations, that goal will be pursued in an integrated way through a sustainable, innovative and productive economy that delivers high levels of employment; and a just society that promotes social inclusion, sustainable communities and personal wellbeing. This will be done in ways that protect and enhance the physical and natural environment, and use resources and energy as efficiently as possible."*
>
> *Department of Environment, Food and Rural Affairs (2005, p. 16)*

Porritt (2009) in *'One future – different paths'* outlined the common goals for SD in the UK and mandated that each devolved administration would produce its own distinctive SD strategy within this broad framework. To achieve this shared vision of SD, a set of guiding principles for the UK (see Figure 3.7) were developed and agreed upon by the UK Government and its devolved governments, including the NAW (Department of Environment, Food and Rural Affairs 2005, p. 16).

Figure 3.7. Guiding principles

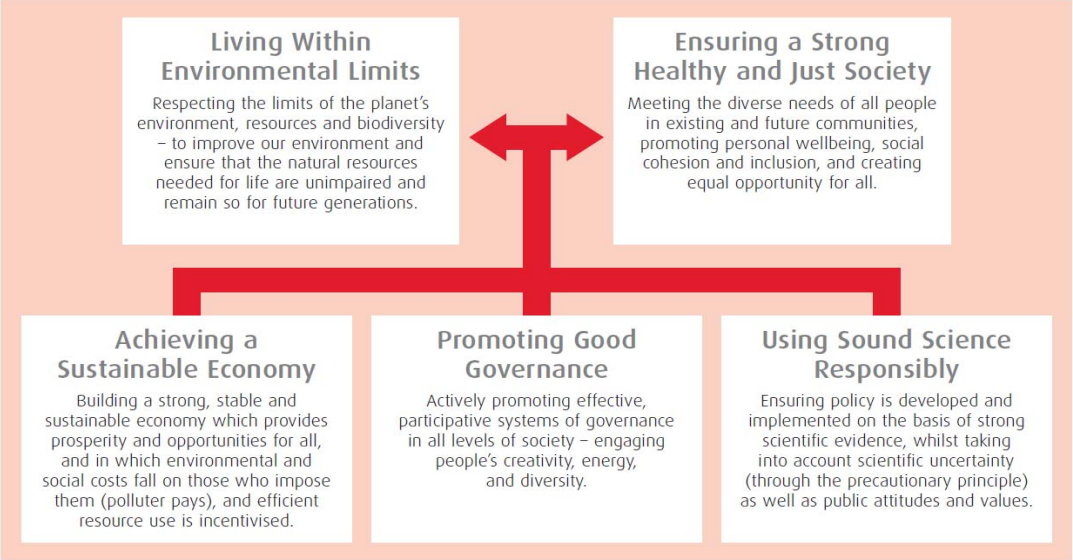


Figure 3.7 sets out an overarching approach, which combines the three core elements of sustainability; environment, society and economy, with the role of government (i.e. governance) and the need to embed scientific evidence within policy making. This method is also linked to action taken in relation to carbon reduction, that is, governmental policy making, drawing upon the support of scientific evidence to develop a more sustainable relationship between the environment, society and economy. A point that warrants additional attention is that in Figure 3.7 the environment and society are positioned in a tier above the economy, which differs from commonly cited definitions stressing equality between the three elements (see Folke et al. 2002; Pearce et al. 1989). This consequently frames economic prosperity as a means through which to create environmental and society stability, rather than as an equal factor to either be balanced or traded off against them.

The UK Government, WAG and the Scottish Executive all subsequently developed different approaches for monitoring progress towards SD, specifically pertaining to both the number and nature of the indicators used. The Department of Environment, Food and Rural Affairs 2005 developed the UK SD Strategy with a set of 20 top level *'Framework Indicators'* and 48 additional supporting indicators across the shared four priority areas:

- Sustainable consumption and production
- Climate change and energy
- Natural resource protection and environmental enhancement
- Sustainable communities.

These are the shared themes of SD adopted by the UK Government and the devolved administrations in 2005. These four themes represent the shared priorities for UK action (Department of Environment, Food and Rural Affairs 2005), and whilst carbon might be primarily associated with climate change and energy, in practice it features strongly across all four themes. Furthermore, the prioritisation of SCP within the UK context aligns with the Rio Declaration of 1992. Following on from this, in 2009 the WAG laid out a strategy document '*One Wales'* and integrated this with a new scheme for SD in 2009 entitled '*One Wales: One Planet*'. Porritt (2009) reported at the time that this represented one of only three legally binding commitments anywhere in the world, referring to WAGs commitment to making annual 3 per cent cuts in carbon emissions as *'radical'*. As one of the first places to have embedded and integrated SD into all policy-making spheres, only Tasmania and Estonia have arguably comparable duties (Williams 2006), and, moreover, to have established this as a statutory responsibility, Wales has been at the forefront of many aspects of policy-making in SD. Wales has shared its experiences within the UK, Europe and beyond via its involvement in the Network of Regional Governments for SD (Peattie 2005b), and has led the way in establishing a European network of countries interested in sharing best practice on SD (Williams 2006). The SD agenda presents manifold challenges for those seeking to develop and implement policies for all functions and at all levels of government. In this respect, Welsh policymakers have also adopted a leadership role within the UK in tackling many of the practical problems involved in implementing sustainability policies. As Jonathan Porritt, Chair of the UK Sustainable Development Commission (2004), noted apropos the "*Welsh Assembly Government's Sustainable Development Action Plan 2004 – 2007*":

> *"The Welsh Assembly Government is unique in the clarity of its vision and commitment to embed SD at the heart of everything it does. The range of Action Plan commitments reflect the need for Wales to act both internally and to play its part in influencing UK and World issues. It represents an exciting opportunity to build on the progress already made in Wales, and to focus on making real and lasting changes."*
>
> *Johnathan Porrit, Sustainable Development Commission (2004)*

The statement highlights the unique position of Wales within the UK (and relatively distinctive position internationally) with respect to the relationship between SD and the policy agenda. This testifies to why Wales represents such a unique location within which to study a key element of policy in relation to SD, namely LCP.

In tandem with WAG, the NAW has pioneered the promotion of both the concept and practice of SD within Wales by embedding SD within its constitution (see Government of Wales Act 1998, section 121). This reflects their statutory duty to integrate sustainability principles within all aspects of policymaking. It also serves to highlight the emergent global acknowledgement of the importance of key individual policy areas, such as community development, health, education, waste, economic policy, transport and public procurement in contributing to SD. Given its potentially profound and cross-cutting implications for governmental policy, SD has also been recognised as constituting an important challenge in terms of leadership and governance for WAG and Wales generally (Williams 2006). This fact is stated by the Former First Minister, the late Rhodri Morgan AM (Quoted in: Peattie 2005b: Foreword):

> *"Good governance is always high on my agenda as it is at the heart of creating a sustainable future for any country. It's more than just about having strong and effective leaders. Achieving real change requires the active participation of all sectors of society"*
>
> *Rhodri Morgan AM (2005)*

In reviewing the evolution of SD governance in Wales, Williams (2006) highlights several important points. Firstly, what has emerged in Wales in the aftermath of the Government of Wales Act is a new governance system for SD that involves a range of duties, frameworks, mechanisms, structures and policy instruments. Secondly, although the WAG has undoubtedly been a key driver, as the SD agenda has evolved within Wales changes have become apparent at both local and national levels, with a diverse range of organisations becoming involved. Finally, the legal framework for promoting SD within Wales both frames SD itself as a *"wicked issue"* that is multi-dimensional, complex, boundary-spanning and immune to linear solutions or quick fixes (Rittel and Webber 1973), and expects SD to integrate and tackle a range of other issues, such as health promotion or carbon reduction (which Williams (2006) frames in terms of *"energy efficiency"*) which in and of themselves may also be perceived as *"wicked"*.

3.4.2 Recent legislation and policy

With its enhanced powers to pass Acts, the WAG has introduced legislation into Wales that reinforces its commitment to SD, many of which have implications for the climate change and carbon reduction policy agendas. Recent notable Acts include the Well-being of Future

Generation (Wales) Act 2015 (WBFG Act) and the Environmental (Wales) Act 2016 (EA Act). These pieces of legislation signify Wales' long-term objective to transition to a low carbon economy via the contribution of organisations and society at large (CCCW 2016). Equally, local authorities can also contribute to SD, both through their Local Agenda 21 strategies and through the importance of SD initiatives at a local level (Peattie 2005b). Given the importance of the public sector to the Welsh economy, encouraging more sustainable management and procurement practices in the public sector has come to be viewed in terms of representing a powerful example for other sectors to aspire to. Moreover, as discussed in Chapter Two, the Stern Review (2006) highlighted public procurement as a crucial lever through which to bring about a reduction in carbon emissions and the impact of climate change. Wales has been making extensive efforts to promote SD and carbon reductions in recent years. Before discussing the specific legislation and policies that have been introduced, it is important to discuss the Public Services (Social Value) Act 2012, which has contributed greatly to SD within the public sector.

Public Services (Social Value) Act 2012

On 31st January 2013, the Public Services (Social Value) Act 2012 came into force for the whole UK. The Policy Procurement Note 10/12 was released simultaneously, which provided guidance supporting the Act (see Cabinet Office, Efficiency and Reform Group and Crown Commercial Service 2012). This Act requires individuals in the public sector to consider how purchasing decisions can engender wider social, economic and environmental benefits. Chapter 3 of the Act outlines it as: *"An Act to require public authorities to have regard to economic, social and environmental well-being in connection with public services contracts; and for connected purposes."* In other words, before a procurement process begins a commissioner must consider what they are going to buy and/or how they are going to buy them, by utilising a broader concept of *"value for money"* in procurement. This should encourage commissioners to talk to their local providers, market intermediaries or even communities to design better procurement strategies.

Wales Procurement Policy Statement (WPPS)

The Welsh Procurement Policy (WPP) which reinforced the practice of procuring sustainably in Wales was launched in 2012 with the *'Wales Procurement Policy Statement'* (WPPS) laying out the procurement practices and actions required of all public sector organisations in Wales (Welsh Government 2015). This policy adopted the Sustainable Procurement Task Force (Procuring the Future 2006) definition of procurement, which is outlined:

> *"the process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organisation, but also to society and the economy, whilst minimising damage to the environment".*

This statement brings SCP (a priority area for the UK) into the mainstream through the activity of procurement. The objective as it is understood here is to use procurement as a strategic tool through which to deliver sustainable benefits to the people of Wales.

SD Charter

The SD Charter launched in September 2012 (Welsh Government 2016b) encourages and enables organisations in Wales to become more sustainable by making decisions that produce the best long-term outcomes for themselves and for the future of Wales. The charter:

- Sets out our vision of a sustainable Wales
- Links the central organising principle to the pursuit of long-term wellbeing for people and communities in Wales
- Describes the benefits stemming from making SD your organisation's central organising principle
- Sets out the commitment that an organisation is making by signing up to the charter
- Explains the subsequent steps Wales will take to support the charter.

Well-being of Future Generation (Wales) Act 2015

The WBFG Act 2015 Act, enacted in 2016, represents an important milestone in how Wales will address present and future climate challenges by implementing seven goals that public bodies must work towards. Low carbon resides under *'A resilient Wales'* section of the seven well-being goals. *'The Essentials'* guide published by the Department for Natural Resources of the Welsh Government in May 2015, breaks down the key aspects of the Act and provides guidance and information about how they affect everyone's lives in Wales. The overview of the Act is outlined below:

> *"An Act of the National Assembly for Wales to make provision requiring public bodies to do things in pursuit of the economic, social, environmental and cultural well-being of Wales in a way that accords with the sustainable development principle; to require public bodies to report on such action; to establish a Commissioner for Future Generations to advise and assist public bodies in doing things in accordance with this Act; to establish public services boards in local authority areas; to make provision requiring those boards to plan and*

take action in pursuit of economic, social, environmental and cultural well-being in their area; and for connected purposes."

Well-being of Future Generations (Wales) Act 2015, anaw 2

Although the Act is being promoted across Wales, the key focus is the *'public sector'* which is mentioned three times in the extract above. The Act represents a progression from Public Services (Social Value) Act 2012 (a UK wide Act) insofar as it provides tangible targets for reducing emissions of GHG and the setting of carbon budgets rather than generic principles and guidelines. Section 10(1) of the WBFG Act required the publication of *"National Indicators"* to measure progress towards achieving the various Well-being goals. In total, 46 national indicators are listed (see WAG 2016a), with Ministers required to publish an annual progress report detailing progress made. The first Report was published in September 2017 *"Well-being in Wales: the journey so far"* (Future Generations Commissioner for Wales, May 2018). The crux of the Act is improving the social, economic, environmental and cultural well-being of Wales, both now and in the future by promoting an innovative, productive and low carbon society. The Act seeks to bring about more effective climate governance by enabling people to have a greater say in determining how their communities adapt to climate-related impacts. WAGs intention here is to ensure that everybody in Wales can have a say in its future – '*The Wales We Want'* (Kythreotis 2015). The WBFG Act may well lay the foundation for numerous pieces of future legislation, which should also help to provide a level of uniformity and consistency in Wales.

Environment (Wales) Act 2016

The Environment (Wales) Act 2016 (EA Act), enacted on 21 March 2016, is focused on planning and managing Welsh natural resources in a more proactive, sustainable and coherent manner. It complements the WBFG Act by dealing primarily with natural resources. The Act is split into seven main parts, and aims to produce significant economic, social and environmental benefits for Wales. The key parts of the act are:

Part 1: Sustainable management of natural resources

Part 2: Climate change – provides the Welsh Ministers with powers

Part 3: Charges for carrier bags – extends the Welsh Ministers' powers

Part 4: Collection and disposal of waste – improves waste management processes

Parts 5 & 6: Fisheries for shellfish and marine licensing – clarifies the law

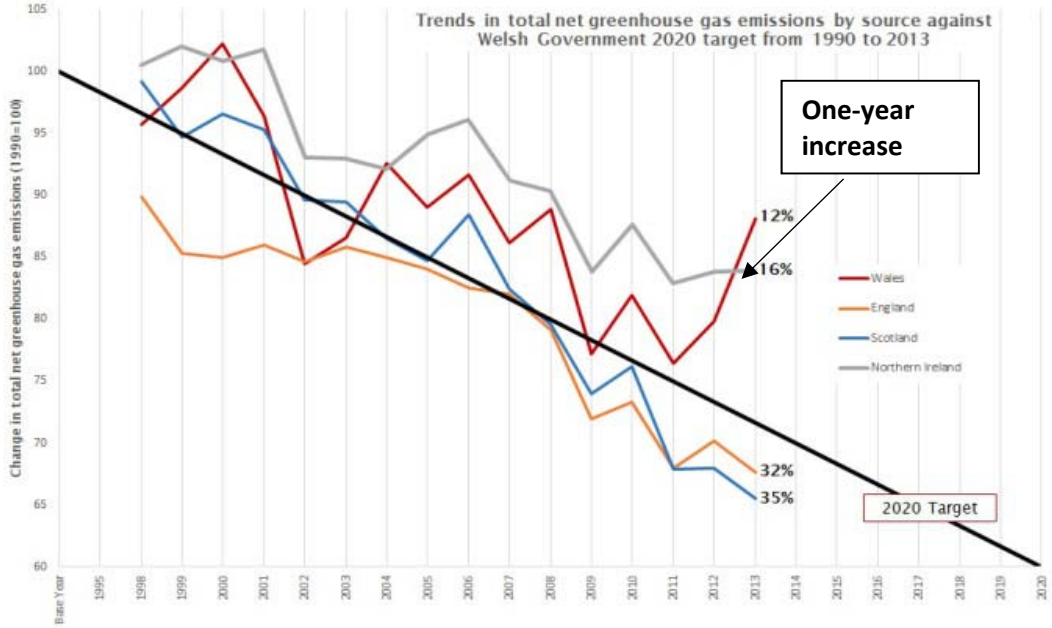
Part 7: Flood & Coastal Erosion Committee and land drainage – clarifies the law for other environmental regulatory regimes

Part 1 and 2 directly link to carbon and climate change. Part 1 centres around outlining how Wales' resources could be managed in a more proactive, sustainable and coordinated way. It also seeks to tackle the impending challenges and focus on the opportunities provided by natural resources. Part 2 focuses on climate change and provided Welsh Ministers with powers to put in place statutory emission reduction targets, including at least an 80% reduction in emissions by 2050 and carbon budgeting to support their delivery. WAG (2016a) explained that the Act was vital within the context of existing UK and EU obligations, in terms of providing a clear pathway for decarbonisation, and providing certainty and clarity for business and investment. It sought to position Wales as a low carbon, green economy, capable of adapting to the impacts of climate change.

3.5 10% carbon increase in Wales

To understand the contribution this thesis can make to sustainability it is important to discuss its origin. The PhD study initially commenced following the GHG Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2013, which revealed a significant carbon increase in Wales. This was officially published by Aether and Ricardo-Aea during 2015, on behalf of the government. Given that Wales was uniquely forward thinking in terms of instilling SD within its policy-making, these results were particularly shocking. Figure 3.8 illustrates the trends in GHG emissions from the baseline in 1990 up until 2013 for the different states in the UK.

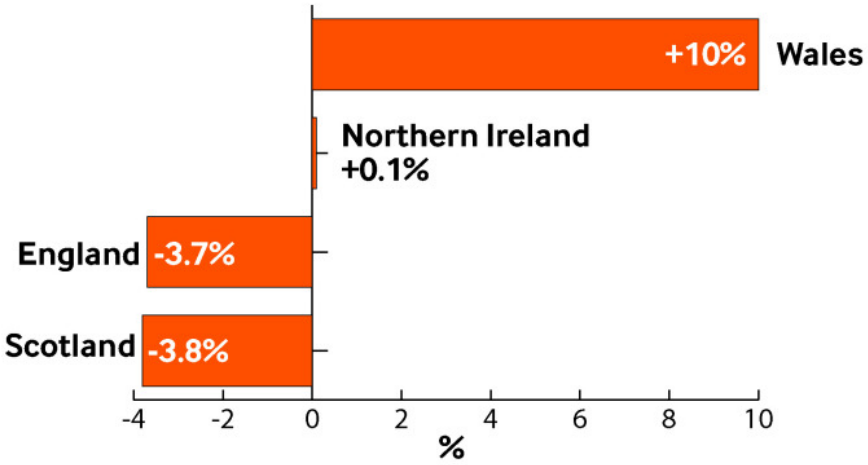
Figure 3.8. Trends in total net greenhouse gas emissions



Source: Millett (2015)

The figures released for 2012 to 2013 show that, although total GHG emissions in the UK have reduced by 12% compared to base year emissions (CCCW Annual Report 2014), with reductions in England and Scotland being attributed to a shift towards renewable forms of energy generation (Aether and Ricardo-Aea 2015), they have increased in Wales by 10%. This is illustrated in Figure 3.9 below.

Figure 3.9. Percentage of change of GHG between 2012 and 2013 by UK states



Source: Millett (2015)

The brief by David Millett from the NAW Research Service on 16th June 2015 identified that this 10% increase was predominately driven by two factors in the industrial process and energy sectors. The Report states that:

> *"The 2012 to 2013 increase of emissions is predominately driven by an increase in emissions from the iron and steel sector due to the restart of Tata Steel's Port Talbot No.4 Blast Furnace in February, 2013, and a shift from natural gas to coal use in power stations."*
>
> *(Aether and Ricardo –AEA 2015)*

Wales has a disproportionately high percentage of the UK's electricity generation and heavy industry, along with being a net exporter of energy via the national grid. Moreover, Wales' industrial legacy has left it with a suite of industries that are relatively *"dirty"* (Research Advisory Panel 2006). However, today much of the output of these industries is consumed outside Wales. Consequently, the *"footprint"* associated with Welsh consumption is arguably a better indicator of the environmental pressure caused by Welsh residents than the footprint associated with Welsh production (Millett 2015). Despite the rationale for the

increase, WAG has sought to address the issue by introducing plans to significantly reduce its carbon emissions with a view to achieving external EU targets.

3.5.1 UK and Welsh targets

The concept of carbon emissions *'contraction and convergence'* was first proposed by the Global Commons Institute in 1990 and has subsequently been endorsed by numerous national and international bodies. Table 3.2 provides an overview of the targets the UK Government and WAG have set, to reduce GHG emissions from now to 2050, against the baseline of 1990.

Table 3.2. Welsh Targets

Target	Description
Annual Targets from 2011	Annual reduction of 3% in Carbon Dioxide equivalent (CO_2e) emissions, in areas of devolved competences against the baseline.
Annual Sectorial Targets	Set minimum contribution to CO_2e emission reductions over a 10-year period relative to contribution to the baseline.
2020 Target	Net CO_2e emissions reduced by at least 40% compared to 1990 levels.
2050 Target	Net CO_2e emissions reduced by at least 80% compared to 1990 levels.

Source: Aether and Ricardo –AEA (2015) data

Wales' targets do not exactly mirror those of the UK government. However, the overall objective of both the UK government and WAG is by 2050 to reduce Net CO_2 emissions by 80% compared to their 1990 levels. For Wales to achieve its 2020 target of reducing total GHG emissions by 40% below their 1990 levels, emissions will need to be reduced by a further 28 percentage points between 2014 and 2020 (Millett 2015). This target represents an appropriate UK contribution to global emission reductions consistent with limiting the global temperature rise to as little as possible above 2°C.

The Committee for Climate Change (2017) explains how the Climate Change Act 2008 established a target for the UK to reduce its emissions by at least 80% from 1990 levels by 2050. In a measure to provide benchmarks towards the 2050 target, WAG has set five-yearly carbon budgets currently running until 2032 as a starting point, as displayed in Table 3.3.

Table 3.3. Carbon Budget (CCC 2017)

Budget	Carbon budget level	% reduction below 1990 levels
1st Carbon budget (2008-12)	3,018 MtCO2e (Metric tons of carbon dioxide equivalent)	23%
2nd Carbon budget (2013-17)	2,782 MtCO2e	29%
3rd Carbon budget (2018-22)	2,544 MtCO2e	35% by 2020
4th Carbon budget (2023-27)	1,950 MtCO2e	50% by 2025
5th Carbon budget (2028-32)	1,725 MtCO2e	57% by 2030

These carbon budgets have been introduced to ensure that regular progress is being made, and to provide a level of predictability to facilitate planning for a low carbon economy. They are also consistent with UK obligations towards EU targets and represent a contribution towards the required global emission reductions (CCC 2017). The CCC (2007) state that the UK has met its first two carbon budgets. Meeting future carbon budgets will require reducing emissions by at least 3% a year. Resultantly, finding ways to accelerate progress across the economy will be necessary in future.

3.6 Key stakeholder agencies

To support their long-term sustainability and low carbon agenda, WAG have created a range of agencies and departments to support, and at times exert pressure towards, transitioning towards sustainability. Key organisations include Value Wales (VW), Cynnal Cymru (Sustain Wales), Future Generations Commissioner's Office and CCCW. A short description of each of these organisations will be provided in turn, with particular emphasis on the CCCW given its centrality in this research.

3.6.1 Value Wales

Value Wales (VW) is the government department tasked with WPP in Wales. They are the policy team, whose mission statement states that it will *"work in partnership with the Welsh public sector as a catalyst to improve value for money obtained from its procurement activity, thereby supporting the delivery of public services while benefiting the social, economic and environmental landscape of Wales"* (BBC 2014). VW has been providing guidance and practical tools to both the public and third sector since 2002. It seeks to improve the public procurement outputs of Welsh public expenditure on goods and services (WAG 2012). The

Welsh public sector spent £5.5bn during 2014-15 (Wales Governance Centre at Cardiff University 2016) and £6bn during 2015-16 (The Welsh Audit Office 2017) on external goods and services. VW is responsible for shaping policy, monitoring practice, supporting and advising professionals, and in terms of developing the procurement profession and compliance with EU regulations, with carbon representing only one of the issues they consider. VW managed the WPPS that launched in 2012, and which set out the procurement practices and actions required of all public-sector organisations in Wales.

3.6.2 Cynnal Cymru (Sustain Wales)

Cynnal Cymru was set up in 2002 the Sustainable Development Forum for Wales. 'Cynnal' is a powerful word in Welsh, which means to sustain, support, nurture and lead. Cynnal Cymru was established as an independent not-for-profit company that had a membership that was open to all. It is currently funded by the Countryside Council for Wales Environment Agency Wales, Wales Council for Voluntary Action (WCVA), Wales Tourist Board and WAG. At the end of March 2016, WAG removed funding for the agency ahead of the opening of the Future Generations Commissioner's Office.

3.6.3 Future Generations Commissioner's Office

The Future Generations Commissioner's Office (FGCO) was established in 2016 at the mid-point of this PhD research. A Future Generations Commissioner has been appointed, which is in accordance with the WBFG 2015. The Future Generation Commissioner (FGC) and the team have been appointed to support the extension of the WBFG Act 2015 into all aspects of Wales. As noted on the FGC Website (2018), a key part of FGC's duty is *"to act as a guardian for future generations"* and *"to encourage public bodies to take greater account of the long-term impact of the things they do."* At present there is little evidence on the impact the FGC and the FGCO has made.

3.6.4 CCCW

CCCW was established in 2007 with secretariat support provided by the Welsh Government Climate Change team providing Wales with an overarching body to support its climate agenda (CCCW 2016). Cynnal Cymru (Sustain Wales) then subsequently provided secretariat support to the Commission beginning in June 2012 (Cynnal Cymru 2015). In March 2016, CCCW ceased operating, handing over all roles and responsibilities to the FGCO. This evolution has been a progressive one, as the FGCO has more authority, legal and regulatory powers in Wales than the CCCW. During the nine years of its existence, the CCCW brought

together key sectors and organisations across Wales to develop a consensus on the action needed to tackle climate change challenges in Wales. Although the commission was predominantly located in South Wales, it operated across the whole of Wales. The Commission was an independent body that provided information and advice to WAG on climate change and sought to build consensus across sectors and report on processes. The CCCWs main roles and principal methods of engagement are outlined in Table 3.4.

Table 3.4. CCCW's roles and methods of engagement (CCCW 2016)

CCCW roles	Methods of engagement
• Provide clear leadership on tackling both the causes and effects of climate change in Wales. • Build agreement/consensus on the action needed in Wales to address climate change and engage all sectors in this process. • Work to remove barriers (i.e. mobilise action) to delivering the climate change agenda and advise on solutions where appropriate. • Advise on the development of Welsh Government policies and programmes. • Monitor progress and report annually. • Be proactive in sharing advice and good practice on climate change action.	• Welsh Members: Voluntary members of the Commission represent a wide range of political, business, local authority (LA), third sector and other organisations. • Increase understanding: Working through our members and the networks they represent, we want to increase understanding of climate change and how it will affect lives and businesses in Wales. • Quarterly meetings: The Commission meets four times a year; meetings include presentations from expert guests and are open to the public. Information about meeting dates, locations and agendas are available on the meeting page. • Sub-groups: The Commission also has a number of sub-groups to move forward our agreed priorities, including adaptation, built environment, land-use and sustainable transport. • Collaboration internationally: Although the work is focused on Wales, the Commission also collaborates with UK, European and global organisations to share ideas and learning.

The CCCW worked from an annual *'Forward Work Programme'* agreed with WAG. CCCW conduct quarterly round table meetings to bring sectors together. As part of the Forward Work Programme (2014/15), funding was allocated to six research projects by the Commission. One of the key projects involved supporting the preliminary research (Cycle One) conducted in this thesis, following the announcement of the 10% carbon increase in Wales. The chapter will now turn to present Cycle One of the research, which informed the direction of the future research cycles. It is presented before the methodology chapter because its findings also acted to shape further methodological choices reflecting the cyclical nature of AR inquiries.

3.7 Preliminary research (Cycle One)

The remainder of the chapter is dedicated to the preliminary research study which is referred to in this thesis as Cycle One. This collaborative study completed in tandem with CCCW and Cardiff University's Business School formed the foundation for this thesis. For this reason, a detailed summary of Cycle One is included highlighting the key findings, which contextualised and subsequent direction of the thesis. The methodology and research design for Cycle One is summarised in this chapter, however, a more concise methodology and research design shall be presented in Chapter Five, which shall discuss all cycles, as such there will be an element of duplication. The objective of Cycle One was to explore the implementation of LCP across different sectors, the aim of understanding how organisations consider carbon within the procurement process. The methodology and research design were developed by the research team, which included Professor Walker, Dr Touboulic and the author. The author was the lead researcher and chief contributor to the study. The research question for Cycle One is outlined below:

RQ1: How is carbon considered in the procurement process?

To answer this question a detailed study was designed and completed. The key elements of that study are covered below.

3.7.1 Research design

A range of methods were used to as part of data collection. The three tables below outline the key features of the research design:

Table 3.5. Overview of data collection

Activity	Data and Time	Description
Discussions and Meetings	Dec 2014-April 2015 (Cardiff University, Business School)	Group and 1-2-1 discussions with CCCW, VW and at Cardiff University, Business School.
Interviews	Feb 2015-June 2015	12 CCCW members were interviewed. Potential interviewees were approached through an email invitation. Topics were covered during semi-structured interviews.
Direct observation	Throughout	A research diary was used to record observations.
Secondary data review	Mar-Sept 2015	Secondary data reviewed i.e. industry, sector and government reports/releases.
Workshop (Shared Learning Event)	Feb 2016 – Cardiff University Business School (Executive Suite)	Facilitated through Cynnal Cymru (Sustain Wales) CCCW and Cardiff University Business School.

The three sectors of the Welsh economy public, private and third were represented. Table 3.6 below provides a description of the objectives and definitions of the three sectors:

Table 3.6. Wales: overview of sectors

Sector	Objective	Definition
Public	Provide public value through services	Providing goods or services to the public. It consists of national and local governments, as well as, their agencies and, their chartered bodies. They interact with suppliers from the private and third sector who deliver goods and services (NCVO 2009)
Private	Businesses for profit and shareholders	Run by individuals and companies. Most private sector organisations are run with the intention of generating profit (Welsh Assembly Government 2008).
Third	Voluntary or 'Not for Profit' (i.e. to support society, government)	Non-governmental organisations which are value-driven, and which principally reinvest their surpluses to further social, environmental or cultural objectives. It includes voluntary and community organisations, charities, social enterprises, cooperatives and mutual organisations (Welsh Assembly Government 2008).

A more comprehensive table compiled by the author about each sector can be found in Appendix B. Participant information including their job title and organisations has been coded for anonymity. Participant data arranged by sector can be found in Table 3.7:

Table 3.7. Participant summary

N°	Private	Public	Third
1	Senior Officer A (SME Trade Body)	Programme Manager (LA Consortium Buyer)	Procurement and Grants Manager (Voluntary Council)
2	Energy Development Manager (Large Chemical Company)	Procurement Manager C (Higher Education 1)	Project Manager (Support Agency 2)
3	Tendering Manager (SME Support Organisation)	Procurement Head A (NHS Wales)	Chair of the Sustainability Committee (Support Agency 4)
4	Senior Officer B (Construction Support Organisation)	Procurement Officer B (Local Authority 3)	Contracts and Procurement Manager (Support Agency 4)

Prior to compiling a list of questions, a review of research papers (e.g. Walker and Brammer 2009), governmental reports, policy documents were conducted that focused on SP. The interview guide that was developed for Cycle One consist of questions and themes that are listed in Appendix C. Semi-structured interviews were used, questions were utilised, with

questions being used as a guide through which to allow the participant and researcher flexibility. The following extract represents the author's contemporaneous diary entries from May and June 2015:

Diary: Commissioner and Minister meeting

May 2015

Today, I received a request from the Climate Change Commissioner's office. This is not necessarily something a PhD researcher like me is expecting to happen to them. If anything, I've viewed my research to be a relatively niche study that very few people would have any interest in. In short, the Commissioner would like a short summary of my initial findings as a talking point for the meeting with Jane Hutt (Minister of Finance) in June. Although I'm still in the field, I nevertheless have enough data to share some preliminary findings. Despite this, it still feels like a daunting task to distill so much information down to two pages. Where do I start, what do I include, and what do I omit? My biggest fear was that whatever I produced would fail to satisfy the Commissioner, as I was still in the process of learning as a researcher.

June 2015

After producing the piece, I was told the document represented an integral document that was presented by the Commissioner to Jane Hutt. It was at this point that I realised that the topic itself, rather than my specific focus per se, was on a much grander scale than I had originally foreseen. Up until now it had not hit me that I was dealing with a topic with such national and global importance, that my project was small component of a much bigger journey towards a low carbon, sustainable society.

3.7.3 Findings

Data from Cycle One was reviewed and coded into dominant themes and concepts, which are presented in Table 3.8.

Table 3.8. Themes and concepts

Theme/ Concepts	Sub-theme/ concepts	Summary
Process of procuring	Procurement Policy	Public sector has a WPP covering environmental sustainability, which carbon is considered to part of. Procurement policies vary across third/private sectors.
	Process of high value procurement	Carbon is considered in terms of high vs low value procurement. A structured procurement process is conducted for procurement valued £25,000 (and above) within the public sector. Public procurement activity often exceeds £25,000.
	Tools	Sustainability procurement tools[5]. Such tools are readily available within the public sector. The term 'carbon' is not explicit in the tools.
	Supplier certifications	Certification requests from suppliers are considered to support environmental sustainability during tender process.
Understanding	Defining/ characterising LCP	Procurers across sectors struggled to define or characterise LCP. Knowledge level is low.
	Skills	Lack of LCP skills across sectors. Procurers are not necessarily experts in low carbon. Frustration is present.
	Basic to advance	Understanding varies widely. Better understanding with senior procurers, large organisations and public sector.
Leadership	Inconsistency	Inconsistency in internal and external leadership.
Power and Multiple pressure	Internal vs External	Internal pressure (inside organisation) and external pressures. Priorities differ and are not always in synergy.
	Government agency	Government agency pressure on sectors. At present, more pressure within the public sector. At times, procurers at times are not aware.
	Network buying pressure	A complex picture emerges of networks buying within the public sector, involving multiple individuals, organisations and networks that all contribute to procurement tasks.
	Organisations' size	Small organisations are less equipped for LCP. Small organisations are more present in third and private sectors. Although large organisations are more equipped, they are characterised by complex structures, resources, priorities and operations.
Sector differences	Lack of cohesion	Lack of cohesion and no uniform approach across sectors. Consideration of carbon varies between sectors.
Operating condition	Price focus	Operating conditions results in focus on price. Price also emerges as a traditional focus of procurement.
	Limited resources	Market and organisation conditions mean many organisations are working with limited resources. At times carbon is not considered.

[5] Will be referred to as 'procurement tools' in this thesis

Amongst the findings for Cycle One, three key findings are particularly important in understanding and addressing the research question, namely; level of understanding towards carbon and LCP, the public procurement process and leadership.

Understanding LCP

Firstly, it was important to explore how participants defined and characterised LCP. Table 3.9 presents interview extracts from across public, private and third sectors that attempts define and characterise LCP.

Table 3.9. Defining and characterising LCP

Sector	Defining & characterising LCP	Knowledge
Private	*"…reducing the carbon footprint through procurement"* *Energy Development Manager* *"SMEs haven't come across this before, never heard of it."* *Tender Manager*	*"A lot of the SMEs I know don't understand the carbon topic, the language, let alone LCP, it's beyond them. They have a lot of resource issues to tend to as they are so small."* *SME Trade Body*
Public	*"something that's good for the environment and sustainability"* *Procurement Officer B* *"…through the process of procurement reducing carbon emissions over the life-cycle of a product."* *Procurement Manager C*	*"This sector is quite broad. Though they try to get it through with the language, such as life-cycle, thinking the procurers don't often understand it, they lack the knowledge and skills at times."* *LA Consortium Buyer*
Third	"We look at the delivery miles when we purchase, that LCP isn't it" *Procurement and Grants Manager* *"something to care about"* *Contracts and Procurement Manager*	*"I think the third sector gets the basics, but the carbon, environmental topic is quite complex for them. Carbon is a complex topic. It means a lot to different people."* *Procurement and Grants Manager*

The findings illustrate a range of differing responses across sectors, with participants finding it difficult to define and characterise LCP. One definition of LCP presented in literature is from offered by Correia et al. (2013).

> *"The process whereby organizations seek to procure goods, services, works and utilities with a reduced carbon footprint throughout their life cycle and/or leading to the reduction of the overall organizational carbon footprint when considering its direct and indirect emissions."*
>
> *(Correia et al 2013, p. 61)*

Not all participants were familiar with the various themes or concepts covered within the definition which include *'carbon footprint'*, *'life-cycle'*, *'carbon footprint'* and *'direct and indirect emissions'*. However, participants, over three sector, associated LCP with carbon emissions emitted from vehicles, with the procurement element rarely acknowledged. Overall, understanding of carbon and LCP differed between the public, private and third sector. There was a clear indication that SMEs within the private sector had little understanding or engagement with LCP which could be related to their size, turnover, as well as the limited resources allocated towards LCP. Of the three sectors, the public sector was ahead in regards implementing LCP, however, the degree of knowledge differed vastly amongst the public sector participants. A positive finding was that three participants from the public sector were able to connect LCP with GPP and SPP. With new concepts such as LCP, definitional diversity (confusion over definitions and meanings) is expected, which accords with the research of Kuhn (1962; 1996). Areas around including sustainability and SD have equally faced definitional diversity which is echoed in the work of Gladwin et al. (1995) and Walker and Brammer (2009) therefore it is probable LCP, given its infancy, would suffer the same fate.

Procurement process

The public sector 'procurement process' was a recurring theme within interviews. Adopting procurement principals from Baily et al. (2015), Lyson and Farrington (2016), reviewing the *'Procurement Route Planner'* (a procurement guide created by VW), interview data and advice from a public sector procurement policy specialist with 30 years of industry experience, the author created Figure 3.10, outlining the different procurement processes within the public sector, where and how carbon is considered. The starting point of the figure is a question posed within an organisation: Does the organisation need to procure? The green boxes outline the process through which carbon is considered.

Figure 3.10. LCP within public procurement process

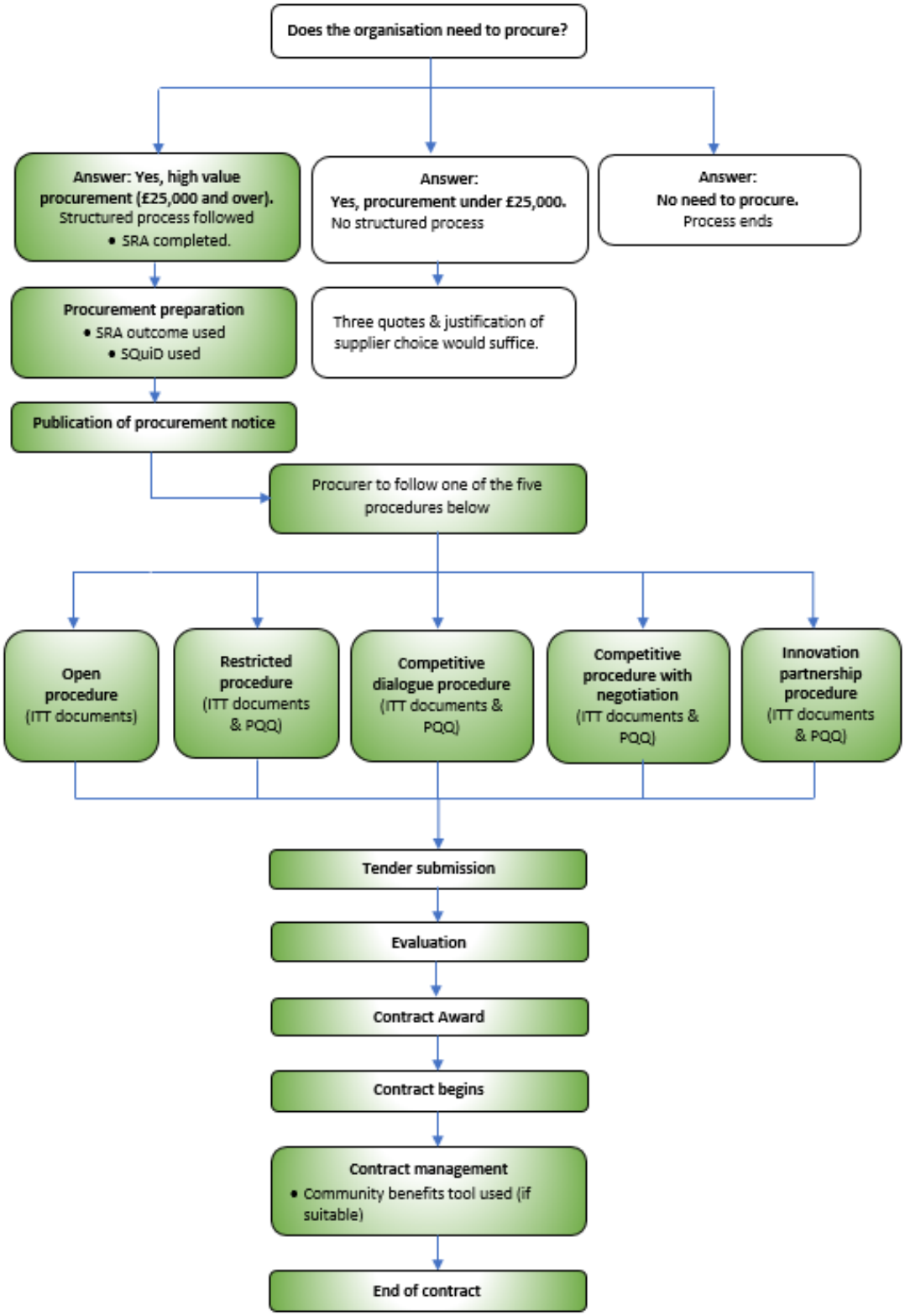


Figure 3.10 outlined that carbon is considered during high value procurement (£25,000 and over), which followed a structured process. The process involves multiple processes within

the overarching structure. During this procurement process sustainability tools (which cover carbon) are used at different stages, which then filters LCP through into the products or services procured (further details can be found in Appendix D). The figure also outlines that high value procurement involves a structured process with different stages, choices of procedures and tools that instil LCP, which are outlined in the following tables.

Table 3.10. Procurement stages

Stages	Description
Procurement preparation	Procurement documents are prepared to seek tenders (offers). During this stage basic carbon requirements/specification is prepared using the SRA outcome, into the tender. Choice is made of procurement procedure e g. restricted. Choice is made of contract type such (i.e. contract, framework agreement).
Publication of procurement notice	Publication of Official Journal of the European Union (OJEC) with PQQ and/or ITT. Published on various sites and publications for potential suppliers to act.
Invitation to Tender (ITT)	Initial step in tendering in which suppliers and contractors are invited to provide offers for supply or service contracts**.** Also referred to as '*Call for Tenders*'. The invitation is published when seeking a supplier who can deliver specific services, goods or work in exchange for payment. ITT procedure is used to generate offers from potential suppliers.
Pre-qualification questionnaire (PQQ)	Sets out a series of questions for potential tenderers to answer regarding for example their level of experience, capacity, capability (i.e. low carbon) and financial standing. The SRA outcomes and SQuiD tool can be used to form a PQQ. Questions around holding ISO14001 and other certifications can be built into the PQQ. The answers to PQQ enable the procurer to produce a short list of suppliers that are likely to be most appropriate. Short-listed suppliers are then invited to tender for the contract.
Tender	The tender is a response to the invitation to tender.
Tender submission	A tender submission is made by a prospective supplier in response to an invitation to tender. Suppliers makes an offer to the supply of goods or services.
Evaluation	It is the process where the procuring organisation evaluates the tenders received against the stated evaluation criteria (i.e. price, quality (.e.g. carbon)). This provides an opportunity to check tenders submitted against the original specification built into the ITT.
Contract award	The process of formally notifying a tenderer that they have been selected as the supplier for a particular contract.
Contract begins	The stage involves the commencement of the contract to obtain the services or products from the selected supplier.
Contract Management	Requirements of contract are managed such as performance against requirement (. e.g. low carbon), completion, payment, disputes. Contract management also involved working internally to support the delivery of the products/service, manging the items in use and the end of life management (disposable). This also involves communication with supplier, regular monitoring of products/services until the end of contract or renewal.

Table 3.11. Choices of procedures available

Procedures	Description
Open procedure	During an open procedure the tender is released. All interested parties can respond by submitting a tender. Tenders are submitted by a set date.
Restricted procedure	This procedure is a two-stage process. During the first stage, interested suppliers are asked to fill out a questionnaire (PQQ) from which a shortlist is formulated. PQQ is used to restrict/shortlist supplier to progress tendering to 3-5. During the second stage, suppliers are selected (shortlist) who are then invited to respond to an invitation to tender (ITT).
Competitive dialogue procedure	A detailed specification is not built but instead description what is wanted. PQQ is used to restrict/shortlist supplier to progress tendering to 3-5 potential suppliers. The procuring organisation enters into dialogue with potential bidders to develop solutions. A selection is made, procurer engages in dialogue with potential bidders to develop one or more suitable solutions, after which chosen bidders are invited to tender.
Competitive procedure with negotiation	A detailed specification is built into the ITT. PQQ is used to restrict/shortlist suppliers to progress tendering to 3-5 potential suppliers. The procurer may then open negotiations with the potential suppliers to get improved offers. The negotiation phase can happen in successive stages as a way of reducing the number of solutions. The procuring organisation can award the contract on just evaluating the 'initial' responses, but this option must be made clear in the tender document.
Innovation partnership procedure	A detailed specification is not built but instead description what is wanted to achieve. PQQ is used to restrict/shortlist suppliers to progress tendering to 3-5. This is the new procedure, which is all about encouraging innovation. A selection is made from those who respond, and the procurer invites potential suppliers to submit ideas to develop innovative works, supplies or services aimed at meeting a need for which there is no suitable existing product on the market. The aim of the procedure is to produce a solution that is currently not available in the market. The procurer can award partnerships to more than one supplier.

In order to use a procedure other than the 'open procedure' the following thresholds must be met in terms of the value of the contract set by Official Journal of the European Union (OJEU) that came into force on 1 January 2018.

Table 3.12. Official Journal of the European Union (OJEU) thresholds

Contact Type	Contact Value
Central government supply and service contract	£118,133
Other authorities	£181,302
For works contracts for all authorities	£4,551,413

Public sector predominantly uses the 'open' and 'restricted' procedure. Competitive dialogue procedure, competitive procedure with negotiation and innovation partnership procedure were only released in 2015 and not in full operation in the public sector.

Table 3.13. Procurement tools that instil LCP

Procurement Tools	Description of carbon considerations
Sustainability Risk Assessment (SRA)	The Sustainability Risk Assessment (SRA) is a tool for achieving sustainable procurement in the public sector. The SRA is completed at the initial assessment stage of a contract. The requirement value level is set as £25,000. The recommended approach to dealing with sustainability is to use the SRA when planning your procurement, it helps identify requirement-specific risks to manage during the selection and tender stages. Answers to the questions are linked to the minimum requirements that should be applied in the procurement process to reduce adverse impacts. Carbon is covered within the SRA through life-cycle thinking looking at resources used. This includes looking at areas of manufacture, which includes utilities (electricity, gas, water) as well as emissions (to air, land or water), product delivery, in-use, waste etc.
Supplier qualification information database (SQuiD)	As part of the tool the public sector buying organisation use the SQuiD questions to generate their question sets. Used during the implementation of a tender: • Can be used in the pre-qualification questionnaire (PQQ) during the restricted process to determine which bidders should be invited to tender. • During the *'open'* process, this can be used in an invitation to tender (ITT). These questions are used as qualification questions to check the suitability of the supplier. There is an option for buyers to ask for information on potential suppliers Environmental Management System certified by UKAS-accredited (or national equivalent) such as ISO14001, Green Dragon. Carbon in considered within such certifications. Buyer can also set questions for environmental policy requests using SQuiD. However, for this to be set as a requirement there needs to be a clear reason.
Community Benefits	The community benefits tool is used by contract/project managers and primary contractors to measure the community benefits of Welsh public sector contracts. Used for projects costing £2 million and over and focused on construction procurement. The community benefits tool is be completed annually on the anniversary of the start of a project or at the end of the contract for those contracts of less than 2 years and 4 months.[6] Carbon is covered though a resource efficiency and life-cycle impact approach. There is also a carbon reduction question (in percentage) available to populate.
Fitness checks and Maturity model	The fitness checks and maturity model work together are not outlined on the diagram. However, they are the framework in which tools (discussed above) operate. The previous Sustainable Procurement Framework (SPAF) has been refreshed to now form the 'fitness checks and maturity model'. Annually public sector organisations are audited (i.e. fitness checks) against the sustainability policy and tools and are then plotted on the maturity model. The Welsh Procurement Policy (WPP) commits public sector bodies to *"measure themselves against the Maturity Model, by undertaking an annual Procurement Fitness Check and reporting the recommendations and action plan progress to Welsh Government"*[7]*.*

[6] http://gov.wales/docs/dpsp/publications/valuewales/140904-community-benefit-summary-en.pdf
[7] Welsh Government. Community Benefits. Delivering Maximum Value for the Welsh Pound – 2014

Overall, four key elements were identified from the interviews and examination of secondary documents in relation to the implementation of LCP (1) Procurement Policy; (2) Process of high value procurement; (3) Procurement sustainability tools; and (4) Certifications. To begin, public sector participants referred to the procurement policy; for example, *'The public sector follows a sustainability public procurement policy, LCP is covered within that'* (Procurement Head A). The *'Procurement Policy'* was also noted by the Energy Development Manager (private sector) and Project Manager (third sector)**.** The conclusion to be drawn from this is that the Procurement Policy covering LCP, whilst limited, is nevertheless active in the public sector, within large organisations (private sector) and the third sector. The process of high value procurement (threshold set at £25,000 and over), at least in the public sector, involves a structured procurement method as the principal avenue through which to consider and implement LCP, as already discussed. This finding complements the work of Walker and Brammer (2009; 2012). Private organisations have also begun to implement structured procurement processes for large purchases. High value procurement activity within the public sector involves the use of specific procurement tools (i.e. sustainability procurement tools), when completed assess the sustainability risk of any purchase (including carbon factors) and enable these to be factored/built into procurement documents and specifications. If required, certifications are then requested from potential suppliers. Table 3.14 displays interview extracts outlining the application of procurement tools and certifications.

Table 3.14. Procurement tools and certifications

Sector	Procurement Tools	Certifications
Private	*"SMEs don't have tools. I don't think they are designed in that way."* Tendering Manager *"We have a robust procurement process here and across all the other countries we operate. Internal tools and templates are part of it."* Energy Development Manager	*"We request to see the environmental certifications of any supplier we deal with. Sustainability is core to our organisations and we make sure suppliers support us."* Energy Development Manager *"SMEs are not really geared in that way. Many don't have environmental certifications and nor do they request them when they buy. They haven't come into business for those sort of things. However, when they supply to the public sector, they have them in place, if required."* SME Trade Body
Public	*"We follow the procurement process which have a suite of tools, documents to complete, which take care of environmental*	*"The team should be requesting certification to pull suppliers towards reducing carbon."*

	sustainability, carbon. We have the SRA, SQuiD, SPAF, community benefits and the new maturity model." Procurement Officer B *"There is a list of sustainability procurement tools available for us procurers. Life-cycle thinking is built within them which covers carbon. I don't think procurers like them though."* LA consortium buyer	Procurement Head A *"There are a host of certifications, which support reducing carbon for example ISO14001, ISO9000, Green Dragon. We just make sure we ask for them."* Procurement Manager C
Third	*"There are a few templates from the public sector which we have access to help address sustainability and carbon matters. I can't remember the names of them all."* Procurement and grants manager	*"A suppler would be expected to hold green certification when supplying the public sector."* Procurement and Grants Manager

Participants also stress that to such procurement tools are *'lengthy'*, *'generic'* and *'complex'*, and that they are invariably used in *'isolation'* as *'tick-box'* exercise. As part of Cycle One, a review of the current procurement tools was conducted. This highlighted the weaknesses of some tools to support LCP. Although the tools attempted to support LCP, *'carbon'* is not covered explicitly, whilst the tools are lengthy, and unaligned and the focus is more on requesting a certification. A detailed analysis can be found in Begum et al. (2016a) including the strengths and weaknesses of the available procurement tools (p. 25, p. 31) and certifications (pp. 34-35), which was published by the author following the completion of Cycle One. Walker and Brammer (2009), identify that certification exists with reference to *'ISO1400/1/EMS'*, but certifications does not appear as a major theme within their study of SPP. However, the Cycle One findings, identify certifications through the form of Environmental Management Systems (EMS) as a key concept for LCP, namely, Green Dragon (a Welsh EMS), BS8555, ISO14001 and ISO9001. Interview findings outline, obtaining and presenting certification was viewed as a *'tick-box'* exercise by participants. Cycle One identified that public sector organisations are encouraged, and often obliged, to both hold environmental certifications and request environmental certification from suppliers. Despite the issues of certifications being perceived as *'tick-box'* exercises, its increased use marks a positive step forward towards promoting and strengthening LCP, especially if when combined with education and further training. Another key finding from Cycle One was around leadership.

Leadership

The concept of leadership was noted by participants across all three sectors, specifically how it served as either as a barrier and enabler of LCP.

Table 3.15. Interview extracts

Sector	Interview extracts
Private	*"Government simply are not providing leadership on the matter."* Energy Development Manager
Public	*"When leadership is present it's easier to get the green, low carbon option through."* Procurement Officer B
Third	*"It's all a case of leadership. If the low carbon, green option is wanted, leadership needs to be present and tell people so. They are not supporting this agenda at the moment."* Contract and procurement manager

The term *'leadership'* within the interviews referred to government and internal organisational leadership. Overall, the findings suggest that greater leadership is required within organisations and externally from government to promote and encourage LCP. The concept of leadership within sustainability is an emergent theme, in the literature, having been recognised by authors such as Brammer and Walker (2011) and, more recently Chiarini and Vagnoni (2016) in their paper entitled: *'Environmental Sustainability in European Public Healthcare: Could it just be a matter of leadership?'*

The following extract represents the author's diary entry from March 2016:

Diary: 'Thinking about the future: the consideration of carbon within the procurement process in Wales' Publication

March 2016

I've arrived back from Germany where I attended the International Purchasing & Supply Education & Research Association (IPSERA) conference. For over 9 months I have endeavoured to produce a report for the Commission. Gathering data about the breakdown of public sector spending in Wales was difficult, and I had yet to obtain it. Having waited months for this data I drew a line under it, and the report needed to be published with or without this data.

I was the lead author and chief contributor to the report. I would be lying if I said I wasn't petrified at the tremendous responsibility bestowed upon me. It was to be my first ever publication that was available in the public domain, as it would be on the Commission's website. Although there had been a number of voices involved in the research, I nevertheless felt the importance of justly presenting the report. This was proving to be something that I found hard to let go of. I emailed the report over to my contact at the Commission and felt a huge sigh of relief. Although the task was undoubtedly a difficult one, involving balancing the expectations of everyone involved, I felt a sense of personal satisfaction once it was published.

The research findings were presented to CCCW. In summary the output of the Cycle One findings, are three-fold, outlined in Table 3.16.

Table 3.16. Research output and impact

Output	Description
Delivery and building consensus	• Presented to CCCW and Central Policy Team during November 2015. • Met with Central Policy Team representative during November 2015 and March 2016 to discuss potential policy changes needed. • Official '*shared learning*' event, held in Cardiff Business School (February 2016) to present research findings with participants and industry officials from three sectors and build consensus.
Publications	• White Paper to WAG in March 2016. Publication title: "*Thinking about the future: The consideration of carbon within procurement process in Wales"* (Begum et al. 2016a). Available in the public domain through CCCW official website. • Competitive conference paper presented at International Purchasing & Supply Education & Research Association (IPSERA) conference (March 2016). Publication title: "*Stakeholder engagement and sensemaking in pursuit of reducing carbon emissions through procurement"* (Begum et al. 2016b).
Impact	• Central Policy Team confirmed that a review of policy tools would be conducted, and changes would be made to factor in carbon into the process. • WAG funding (undisclosed figure) and support arrangements made to support SMEs with knowledge transfer and obtaining certifications. • Recognised within the public sector for being awarded 'Young Professional of the Year' at Welsh National Procurement Award on 10 June 2016 for contribution to Wales (Institute for Competition and Procurement Studies 2016). This publicised the research contained within this thesis.

3.7.4 Reflection and scope for further research

The Cycle One findings demonstrate that the implementation of LCP currently differs across the sectors and their practices. Two clear avenues for further research emerged out of this cycle: firstly, how to examine the implementation of LCP within SMEs, which would involve an investigative approach that focuses on those area in which implementation is currently low; secondly to pursue in-depth research into the public sector, which has already made significant inroads in the implementing of LCP, a relatively new concept in procurement activities. The opportunity to present the findings from Cycle One to peers, academics, other experts in the field of procurement and sustainability, and governmental bodies (including CCCW), generated invaluable feedback. This feedback laid foundation for the direction of the next cycle of research. The consensus from peers, academics and government bodies (including CCCW) and the author was that greater in-depth research into LCP specifically within the public sector, applying the findings gained from Cycle One, would be highly beneficial, and henceforth became the focus of Cycle Two. Moreover, the SME group was not entirely being shelved as the impact from Cycle One resulted in funding and support

being arranged for SMEs to support LCP. The two additional advantages of conducting research within the public sector (the largest sector in Wales) is that it provides an opportunity to share knowledge with other sectors, and initial access has already been granted. To assist the research an overarching research question was subsequently formulated for the purpose of the thesis.

RQ: How can LCP within the public sector potentially contribute to progress towards sustainability, and how can we understand and manage the processes and factors relevant to its effective implementation?

3.8 Summary and Conclusion

This chapter was structured into two parts. The first part provided an historical overview of SD in Wales dating back to the industrial revolution. The chapter then moves to explicated Wales as a unique context in which to conduct research into sustainability, due to the fact that it is one of unique and the first places in the world that sought to embed SD across all of its governmental operations after the devolving of Welsh legislation and policies related to SD and procurement. New legislation (WBFG Act 2015 and EA Act 2016) allied with new governmental bodies (VW, CCCW, Sustain Wales and FGCO) have all pursued sustainability activities such as LCP to enable its implementation. Moreover, the chapter showed that although Wales has positioned itself as a pioneer in this field, it does so against an unstable backdrop of historical instability following the industrial revolution. Along with this discussion, the chapter also drew attention to the recent carbon increase (ten percent increase in carbon in one year (2012-2013)), which formed the basis of the research conducted as part of Cycle One.

The second part of the chapter presented the findings from Cycle One, which explored LCP with participants from the public, private and third sectors, respectively. Cycle One served as the foundation and justification for the subsequent research conducted for the purposes of the thesis. Overall, the most important conclusion emerging out of Cycle One was that the next cycle of inquiry into the implementation of LCP should focus specifically on the public sector. Consequently, the thesis' overarching research question was formed. The next chapter presents a SLR of SPP to identify and better understand the theoretical underpinnings and practicalities of SPP, before proceeding to delineate how research into LCP can contribute to the SPP literature.

4 Systematic Literature Review of Sustainable Public Procurement

4.1 Introduction

This chapter builds upon Chapter Two's review of the literature relating to sustainability by providing a Systematic Literature Review (SLR) of the Sustainable Public Procurement (SPP) literature and identifying where a study into LCP can make a contribution. Chapter Three presented an overview of SD within the Welsh context to establish its uniqueness as a research site. Following reflection from the initial Cycle One research, it was clear that to understand and promote the role of LCP within SPP, it was important to better understand both the theoretical underpinnings and practicalities of SPP. Therefore, two SLR research questions were formulated to guide the undertaking of a systematic review:

SLR RQ1 How has theory been used or adopted within SPP literature?

SLR RQ2 What are the key implementation themes that emerge from SPP literature?

To answer these questions the chapter is organised into five parts. Part one, the introduction, outlines the objective of the chapter to narrow down the literature for the research. Part two outlines the systematic process (methodology) used including the screening process for the review, as well as a combined overview of the body of SPP literature. In part three, the literature is explored using descriptive statistical analysis. Part four contains a more detailed thematic analysis and discussion of the results of the systematic review in relation to the research questions. Challenges and gaps in extant literature[8] will be explored in this stage. Finally, part five summarises the chapter, before drawing conclusions and outlining the specific avenues through which this research can contribute to the field. Table 4.1 and Figure 4.1 have been formulated to guide the discussion and outlines the conceptual relationship between SPP and LCP. Table 4.1 contains definitions of the sustainability concepts discussed over the course of the chapter.

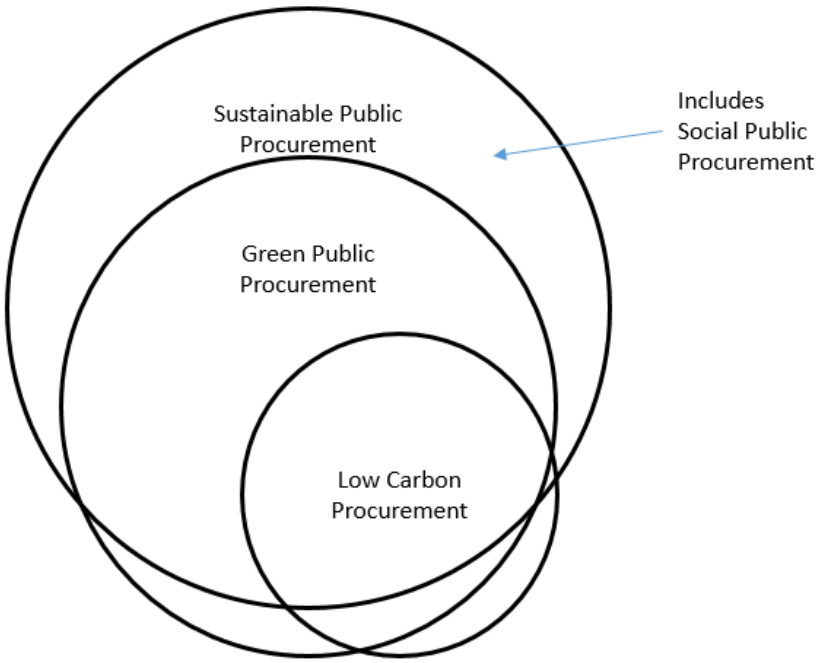
[8] The term 'extant literature' for the remainder of this thesis refers to SPP literature

Table 4.1. Definitions of Sustainability Concepts

Sustainability Concepts	Definition
Sustainable Public Procurement (SPP)	*"…the act of integrating a concern for broader social and environmental impacts within procurement undertaken by government or public sector bodies. Research concerned with SP is either concerned with the direct or indirect achievement of broader social and environmental ends through procurement activities."* (Brammer and Walker 2011, p. 455)
Social Public Procurement (SoPP)	*"…defined as public procurement where the contracting authority applies additional socially oriented requirements."* (Kordestani 2017, p. 313)
Green Public Procurement (GPP)	*"Green Public Procurement (GPP) is defined as purchasing which reduces environmental impacts across product or service life cycles."* (Rainville 2017, p. 1029)
Low Carbon Procurement[9] (LCP)	*"The process whereby organizations seek to procure goods, services, works and utilities with a reduced carbon footprint throughout their life cycle and/or leading to the reduction of the overall organizational carbon footprint when considering its direct and indirect emissions."* (Correia et al. 2013, p. 61)

Figure 4.1 schematises the connection between the concepts to illustrate where this thesis contributes to extant SPP literature.

Figure 4.1. Relationship between SPP, GPP and LCP



Source: Adapted from Correia et al's. (2013, p. 61) model

[9] At the onset of writing the PhD thesis there was no established definition of low carbon public procurement (i.e. public sector specific definition), and thus the most logical choice was to apply this definition within the context of public sector organisations.

The layered perspective presented in Figure 4.1 outlines the connection between SPP, SoPP, GPP and LCP. The largest of the layered rings represents SPP. As explained earlier in Chapter One, Correia et al. (2013) outlines, whilst there is a connection between the rings, conceptually they are likely not to overlap perfectly. Correia (2013, p. 60) explains this *"because procurers will have to deal with multiple trade-offs between LCP agenda, and other complex organizational and political priorities."* For the purposes of this thesis, discussions of LCP assume that they contribute towards greater sustainability, but yet as the model derived from Correia et al. (2013) makes explicit, this is not always guaranteed. To answer the two SLR research questions a review of the literature took place. This process will be discussed below.

4.2 The SLR process

To the best of the author's knowledge, this is the first systematic review of SPP literature, although two niche reviews have recently been published: Cheng et al. (2018) review on GPP, and Stefani. et al. (2017) review on sustainable public food procurement, both of which analyse the state of specific research and identify avenues for future research. This demonstrates the emergent interest and momentum within SPP.

A SLR is a highly structured process of selecting, reviewing and evaluating current research, underpinned by transparent decision-making mechanisms that are repeatable (Fink 2010; Rousseau et al. 2008). This ensures a clear, impartial, transparent and auditable process. Moreover, SLRs allow for *"integrating a number of different works on the same topic, summarising the common elements, contrasting the differences, and extending the work in some fashion"* (Meredith 1993, p. 8). The SLR approach thus provides insights into current research interests, whilst ensuring the objectivity and validity of the research gap identified (Seuring and Muller 2008; Tranfield et al. 2003). This chapter follows Tranfield et al's. (2003) approach (originally developed in medical research) to conducting a SLR and focuses on peer-reviewed papers as detailed below.

4.2.1 Scoping

The SLR combines *'sustainability'* and *'public procurement'*. To achieve a comprehensive overview of the literature, terms are used to search for peer-reviewed papers in research databases. This is in line with previous scholars SLRs, such as Alexander et al. (2014), Cheng

et al. (2018), Defee et al. (2010), Halldorsson et al. (2003), Harland et al. (2006), and Touboulic and Walker (2015), who all filtered their data through key word searches in the fields of logistics, purchasing and supply chain management.

The scoping process was initially conducted with a small set of terms which were subsequently refined. Search terms were either added or removed depending on the database search output; for example, ethics was removed due to the wide conceptualisation of the concept. The wildcard approach, symbolised by *, was also used to identify variations of a term (e.g. environment, environmental and environmentalist). The term *'green'* was used in the final protocol due to its use in relation to environmental sustainability. Table 4.2 presents the final terms used to represent *'sustainability'* and *'public procurement'*.

Table 4.2. Final search terms used under 'Sustainability' and 'Public Procurement'

Sustainability	Public Procurement
1. Sustainable 2. Sustainability 3. Social 4. Ethical 5. Environment* 6. Carbon reduction 7. Emission reduction 8. Green 9. Greenhouse gases	1. Public procurement 2. Public purchasing

While the range of terms used to search for SPP was comprehensive, the author acknowledges that it may not have produced an exhaustive list of relevant papers. The search terms were connected by linking words directly through adding *"and"* or *"for"*. When words were directly combined (e.g. *"sustainable public procurement"*), quotation marks were placed outside to keep search terms together and narrow down relevant literature. Variations of words, terms and phrases were used and tested in Scopus for an optimum relevant output. In accordance with Tranfield et al. (2003), a *'Research Protocol'* was developed (see Table 4.3) including final terms combinations. An overview of the research protocol and the rationale for decisions and observations is discussed below.

Table 4.3. Research Protocol

Research protocol	Search Route
Database used	Scopus holds more than 20,000 titles and thus provides a comprehensive range of publications
Key words search	*"Sustainable public procurement"* *"Sustainability" and "public procurement"* *"Social" and "public procurement"* *"Ethical" and "public procurement"* *"Carbon reduction" and "public procurement"* *"Environment" and "public procurement"* *"Emission reduction" and "public procurement"* *"Green public procurement"* *"Greenhouse gases"* and *"public procurement"* *"Sustainable public purchasing"* *"Sustainability" and "public purchasing"* *"Social and "public purchasing"* *"Ethical and "public purchasing"* *"Carbon reduction" and "public purchasing"* *"Environment" and "public purchasing"* *"Emission reduction" and "public purchasing"* *"Green public purchasing"* *"Greenhouse gases" and "public purchasing"*
Field search	Searched for keywords in only the title, abstract and keywords.
Language	Limited to English only.
Source	Peer-reviewed journals only, excluding: Conference Proceedings, Books, Trade publications and Book series.
Publications	Articles and Reviews only, excludes: conference papers, articles in the press, editorials, short surveys, conference reviews.
Date range	No start date – up to and including December 2017
Manual screening Stage 1	Papers that did not have SPP as a primary focus were removed, e.g. papers mentioning it as a side issue. Duplication in papers were removed.
Manual screening Stage 2	Additional literature reviews and papers examined outside the review, additional papers where then added on the basis of their relevance
Manual screening Stage 3	Remove all legal reviews.
Manual screening Stage 4	Involved establishing whether the focus of a paper was of a technical/modelling nature, such as Life-Cycle Assessments and calculations. Such papers were removed from the data set.

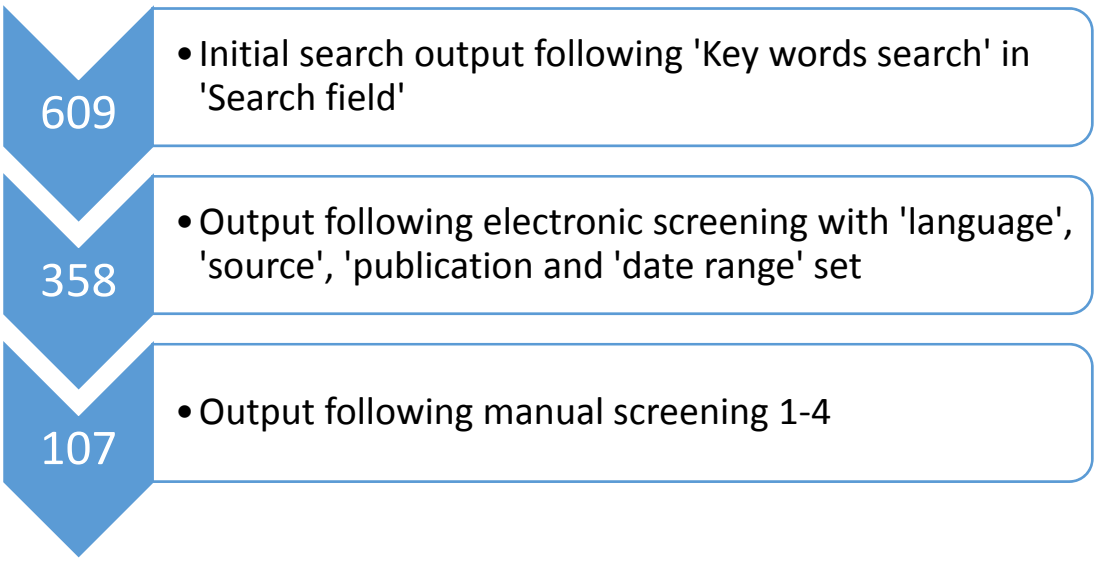
Scopus was selected for the SLR because the research is cross-disciplinary, and Scopus has the broadest database for searching which provides a breadth of relevant papers that may lie outside of the traditional field. Scopus also has the capability to collect and analyse the *'most comprehensive'* and *'valid picture'* of articles, including aspects such as impact and citation data (Chicksand et al. 2012).

Key words were searched in the *'title, abstract and keywords'* field only, to provide a degree of focus, because when one searches through the entire paper these terms, such as 'social'

and *'public procurement'*, may merely be used casually as opposed to being the primary focus of the paper. The initial search of terms in *the 'title, abstract and keywords'* field produced an output of 609 papers.

The Research Protocol consisted of a dual-screening process: first electronic and then manual screening. The review limited itself to English papers in peer-reviewed journals in the Source field with *'Articles'* and *'Reviews'* only to ensure consistency and quality (Burgess et al. 2006). This process reduced the number of papers to 358. The earliest result dated back to 1984, illustrating the relatively recent emergence of the topic. The 358 papers were then manually screened using a four-stage process: All 358 paper abstracts were read and any papers where SPP was not the primary focus (e.g. several legal review papers considering how to incorporate SPP into legislation were screened out as they are not relevant here). Literature reviews in SPP, were consulted to identify additional relevant papers, particularly following Cheng et al.'s (2018) and Stefani et al's. (2017) SLRs. Literature reviews within Brammer and Walker (2011) and Walker and Brammer (2009; 2012) were also used to identify papers on SPP. New papers were screened using the *'language'*, *'source'*, *'publication'* and *'date'* criteria outlined in the Research Protocol, as well as through the full manual screening process. All technical/modelling orientation papers or environmentally focused papers, examining aspects such as life-cycle calculations, carbon calculations in procurement, and in-depth technical weighting of tenders were removed as they were outside the scope of this review. Any *'close call papers'* were read fully to decide about inclusion. This process produced 107 papers from the original yield of 609 (see Figure 4.2).

Figure 4.2. Filtration of papers



The full list of papers is in Appendix E and each paper is allocated a number, and in this chapter, all papers are referred to by these numbers. As part of this process, the papers were categorised.

4.2.2 Categorisation of papers

The selected papers were coded to provide the answers to the research questions. Seuring and Muller (2008) notes, inter-coding with a partner or team is a useful option for reducing bias and increasing reliability and validity, however with a PhD this is not feasible. To strengthen the validity and transparency of the process, the author has chosen to delineate the process and procedures in detail. The coding process adopted was consistent with Saldana's (2016) principles of content analysis. A description of the categories and descriptions used is outlined in Table 4.4, whilst Table 4.5 provides a coding data extract.

Table 4.4. Coding categories and description

Coding category	Description
Article Type	Four categories have been allocated for selection: research/empirical, literature review, conceptual, discussion.
Sustainability dimension	Outlined whether standalone, i.e. environmental, social or combined (sustainability mix).
Method	Primary methodology used to collect data, e.g. case studies, secondary data, interviews, literature review, survey.
Theme	Article's implementation focus, that emerged e.g. barriers
Theory	Theoretical lenses used in the article (if outlined) or theory building
Location	Geographical location of research
Main finding	Main findings/outputs

Table 4.5. Coding data extract

Authors	Year	Pub	Article Type	Sust dim	Meth	Theme(s)	Theory	Location	Main finding
HW, SB	2012	IJOPM	Emp.	Combined	Survey	Barriers, enablers	Theory building	World wide	Varies with policy context
JM, LM RM	2017	JPSM	Emp.	Combined	Case study	Barriers	RBV	UK	Insights into why public procurement struggled

All the documents were manually coded and involved creating a coding book, which provides a description of codes (see Appendix F). *'Article type'* and *'Sustainability dimension'* categories were deductively coded using category options outlined in Table 4.4. For example,

Touboulic and Walker (2015, p. 31) posit that *"all papers [in the SSCM] sample fit into the economic dimension as they all address specific issues related to business transformation for sustainability"*. This corresponds with earlier work from Hopwood et al. (2002). The principle suggested by both Touboulic and Walker (2015) and Hopwood et al. (2002) was adopted to form three categories: environmental, social or combined (sustainability mix). The '*Method*' category was abductively coded while *'Theme(s)'*, *'Theory'*, *'Research Location'* and *'Main findings'* categories were inductively coded, allowing the information to emerge from the data set (as per Touboulic and Walker's (2015) framework).

4.3 Descriptive analysis

This section provides general descriptive statistics from the analysis. Firstly, papers were categorised according to where they were published, i.e. Association of Business Schools (ABS) publications (69 papers) and non-ABS publications (38 papers). As part of this section, a short overview of ABS and non-ABS publications will be provided.

4.3.1 ABS and Non-ABS publications

In the UK, the ABS Journal list is widely used as quality for measure within business studies. According to Harvey et al. (2015), the highest ABS ranking is 4* world-leading quality journals compared to 2 and 1* presenting original research of an acceptable standard Table 4.6 presents papers by their ABS subject classification, ABS ranking, number of papers within a publication and the journal title in the data set.

Table 4.6. ABS Journals by Ranking and Frequency

ABS subject classification	ABS Rank	No of papers	Journal Title
Accounting	2	3	Public Money and Management
Economics, Econometrics and Statistics	3	3	Ecological Economics
	2	1	Journal of Consumer Policy
Marketing	3	1	Industrial Marketing Management
Operations and Technology Management	4	1	International Journal of Operations and Production Management
	3	1	International Journal of Production Economics
	2	1	International Journal of Project Management
	1	5	Journal of Public Procurement
	2	3	Journal of Purchasing and Supply Management
	3	4	Supply Chain Management: An International Journal
Operations Research and Management Science	1	1	International Journal of Construction Management
Public Sector and Health Care	3	1	Environment and Planning C: Government and Policy
	1	2	International Journal of Public Sector Management
	4	2	Public Administration: An international quarterly
	4*	1	Public Administration Review
	1	1	Public Performance & Management Review
Regional Studies, Planning and Environment	3	2	Business Strategy and the Environment
	1	3	Corporate Social Responsibility and Environmental Management
	4	1	Environment and Planning A
	3	3	Journal of Environmental Management
Sector Studies	1	2	British Food Journal
	2	1	Energy Policy
	2	1	Marine Policy
	2	21	Journal of Cleaner Production
	1	1	Voluntas: International Journal of Voluntary and Non-Profit Organizations
Social Sciences	2	1	Geoforum
		1	Science and Public Policy
Strategy	1	1	Journal of Change Management

Recent changes in the ABS guide in 2018 are reflected in the table, including new inclusions like the 'Journal of Cleaner Production', a multi-disciplinary Journal containing 21 papers, which is a key contributor to the dataset. Although, ABS cover the discipline of business studies within the UK, this does not necessary mean that non-ABS journals are lacking in quality; rather, they are merely outside the ABS parameters. The fact that the 38 papers, presented in following table, lie outside the ABS list indicates that SPP is cross-disciplinary and cross-national.

Table 4.7. Non-ABS Journal Titles

Journal Names	Papers per title
International Journal of Procurement Management	3
Natural Resources Forum	3
Sustainability (Switzerland)	2
Sustainable Development	2
Architectural Engineering and Design Management	1
Business: Theory and Practice	1
Climate Policy	1
Comparative Economic Research	1
Eco-Management Auditing	1
Economics and Policy of Energy and the Environment	1
Environment, Development and Sustainability	1
Greener Management International	1
Innovation: The European Journal of Social Science Research	1
International Journal of Electric and Hybrid Vehicles	1
International Journal of Environmental Research and Public Health	1
International Journal of Life Cycle Assessment	1
International Journal on Food System Dynamics	1
Journal of Environmental Planning and Management	1
Journal of Green Building	1
Journal of Integrative Environmental Sciences	1
Journal of Mechanical Engineering Research and Developments	1
Journal of the Chinese Institute of Engineers	1
Jurnal Pengurusan (UKM Journal of Management)	1
Labour	1
Leadership in Health Services	1
Mitigation and Adaptation Strategies for Global Change	1
Periodica Polytechnica Social and Management Sciences	1
Problemy Ekorozwoju (Problems of Sustainable Development)	1
Proceedings of Institution of Civil Engineers: Management, Procurement and Law	1
Quality - Access to Success	1
Review of European Community and International Environmental Law	1
Society and Economy	1
Total	38

4.3.2 Publication by year

The first reference to any of the search terms was from 1984 (before the filtration process) coinciding with the upsurge in interest in sustainability concepts outlined in Chapter Two. Figure 4.3 represents the distribution of papers in the dataset by year of publication.

Figure 4.3. Publication by year (2000-2017)

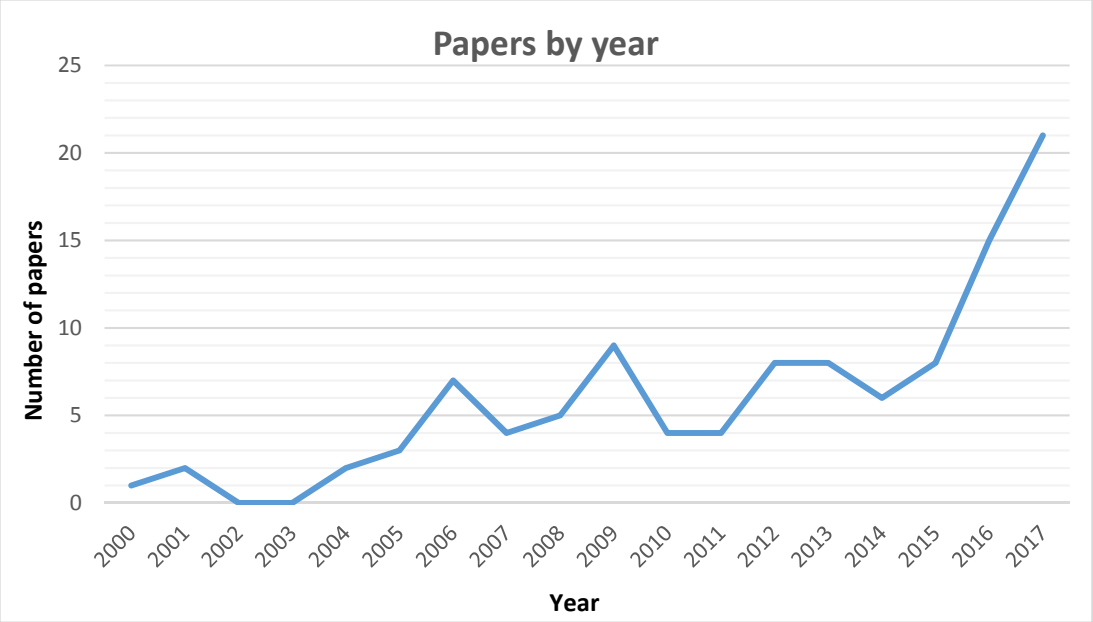


Figure 4.3 presents papers from 2000 to 2017 while Table 4.8 provides a detailed view of the 74 papers published per year since 2010 showing a mostly upwards trajectory with 2017 alone accounting for 21 papers, the highest number in a single year. An explanation could be the renewal, in 2009, of the European Union Sustainability Development Strategy and its key objectives for 2018, which in part, may explain the relative growth in publications since 2010.

Table 4.8. Publications 2010-2017

Year	Papers published
2010	4
2011	4
2012	8
2013	8
2014	6
2015	8
2016	15
2017	21

4.3.3 Article type

The papers were analysed by article types: *'research/empirical'*, *'conceptual'*, *'literature review'* and *'discussion'*. Table 4.9 presents the articles by their allocated number.

Table 4.9. Article types by allocated number

Article types	Research/Empirical	Literature Review	Conceptual	Discussion
Paper number	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 54, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 103, 105, 106, 107	55, 104	53, 101, 102	9, 25, 72
Total	99	2	3	3

The overall implication from reviewing articles by type is that *'research/empirical'* papers dominate the dataset, which is not entirely uncommon in an emergent field of study, which can be driven by the need to explore and unpack an embryonic concept or issue and help to establish the field as a sub-discipline (Walker et al. 2015). However, the small range of literature reviews and discussion papers also point towards signs of conceptual development and growth in the field.

4.3.4 Sustainability Dimension

To understand the current sustainability issues explored by the papers, Table 4.10 presents paper numbers in relation to the three distinct categories: social, environmental, social and sustainability (mix).

Table 4.10. Breakdown of SPP papers

Sustainability Dimension	Social	Environmental	Sustainability (Mix)
Paper number	5, 16, 24, 37, 50, 55, 60, 78, 80, 96, 97	1, 2 , 3, 4, 6, 7, 8, 9, 10, 11, 12, 14, 17, 20, 21, 22, 23, 26, 27, 31, 32, 34, 35, 36, 39, 42, 46, 48, 51, 52, 53, 54, 57, 59, 62, 68, 70, 71, 72, 74, 75, 76, 79, 83, 84, 85, 86, 87, 88, 90, 94, 99, 101, 102, 106, 107	13, 15, 18, 19, 25, 28, 29, 30, 33, 38, 40, 41, 43, 44, 45, 47, 49, 56, 58, 61, 63, 64, 65, 66, 67, 69, 73, 77, 81, 82, 89, 91, 92, 93, 95, 98, 100, 103, 104, 105
Total	11	56	40

One observation from Table 4.10 is that social papers only represent 10%, whereas sustainability (mix) papers represent 37% and environmental papers represent 52%. This indicates that a large proportion of papers explore the links with the environmental dimension, corroborating the findings of Brammer and Walker (2011), Cheng et al. (2018) and Walker and Brammer (2009; 2012). The data signals that the literature around SoPP is relatively limited. However, social papers have emerged in the literature from 2010-2017 as per Table 4.11.

Table 4.11. Papers by Sustainability dimension (2010-2017)

	2010	2011	2012	2013	2014	2015	2016	2017	Total
Social	1	0	0	2	1	0	2	2	8
Environmental	3	1	3	5	2	3	9	9	35
Sustainability (Mix)	0	3	5	1	3	5	4	10	31
Total	4	4	8	8	6	8	15	21	74

Table 4.11 shows there is considerable scope for more research to contribute specifically to the slowly emerging SoPP literature.

4.4 Thematic analysis

This part of this chapter analyses and discusses the results of the SLR in relation to the SLR research questions, beginning with question one.

4.4.1 Theory

SLR RQ1: How has theory been used or adopted within SPP literature?

Handfield and Melnyk (1998) argue that theories constitute the underpinnings of knowledge construction. This thesis aims to contribute to the body of knowledge in this emergent field of study, and hence it is important to explore the current theoretical framework in SPP literature. Authors such as Bacharach (1989) and Gioia and Pitre (1990) provide definitions of what constitutes theory. Gioia and Pitre (1990, p. 587) refer to theory as *"a coherent description, explanation and representation of observed or experienced phenomena".* Bacharach (1989, p. 496) frames theory *as "a statement of relations among concepts within a set of boundary assumptions and constraints. It is no more than a linguistic device used to organize a complex empirical world"*. An alternative interpretation is that theory describes

and explains a process or sequence of events (DiMaggio 1995; Mohr 1982). The papers here are presented by their use of theory in Table 4.12.

Table 4.12. Theoretical base of papers

Theory	Total number of papers	Paper reference number
A-theoretical	85	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 39, 40, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 55, 56, 59, 60, 61, 63, 64, 66, 68, 69, 71, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 92, 93, 95, 96, 97, 99, 100, 104, 106, 107
Theoretical	22	11, 33, 37, 38, 41, 49, 53, 54, 57, 58, 62, 65, 67, 70, 73, 91, 94, 98, 101, 102, 103, 105
Total	107	

One notable observation is that the field of SPP is currently lacking a strong theoretical basis, as 79% of all papers are a-theoretical. This supports Walker et al.'s (2015) research on the theoretical basis of literature in Operations Management (OM). Walker et al's. (2015) SLR explained that the lack of theory in the discipline may impede its progress, and thus called for more theoretical research. SPP can be understood as a sub-discipline of OM, and therefore affected by its disciplinary roots. Moreover, SPP is a relatively new topic, which may also explain the lack of theoretical work in the field. This is a troubling omission given that making a theoretical contribution is a key criterion for top management journals (Carter 2011; Colquitt and Zapatta-Phelan 2007; Hambrick 2007; Walker and Brammer 2012). Understanding the use of theory in SPP is aided by separating out *'theory building'* and *'theory testing'* based work. Researchers applying a theoretical lens from a pre-existing paradigm to understand a topic are engaged in theory testing (Colqitt and Zapata-Phelan (2007); Schmenner et al. (2009). Theory building begins with the researcher observing the concept to generate inductive reasoning (Chalmer 1999). One's adopted theoretical lens may overlook key aspects of a new topic (Schmenner et al. 2009). The 22 theoretical papers have been broken down to understand their contribution, with respect to theory building and testing as shown in Figure 4.4.

Figure 4.4. Theoretical papers

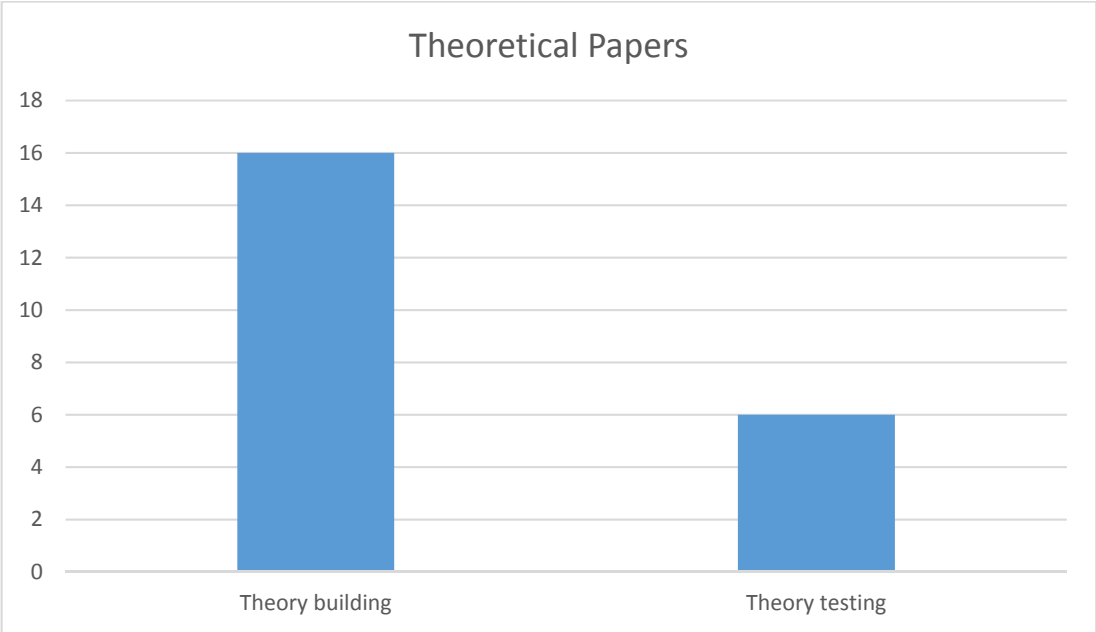


Figure 4.4 shows nearly three times as many theory building papers compared to theory testing, which is consistent with expectations of an emergent field (Walker et al. 2015). Through the coding process, papers were categorised by the theories they used, with five theoretical lenses adopted as shown in Table 4.13.

Table 4.13. Adopted theories

Theory	Description	Unit of analysis	Origin	Key authors	Authors from review
Institutional theory (IT)	Institutional Theory considers the processes by which structures, including schemes, rules, norms, and routines, become established as authoritative guidelines for social behaviour. External social pressure, coercive, mimetic and normative, influence organisations to gain legitimacy.	Individual or collective (group, industry, national)	Sociology	DiMaggio and Powell (1983), Scott (1995)	Borg et al. (2006)
Representative Bureaucracy	Representative Bureaucracy suggests when a public agency mirrors demographically the community it serves (passive representation), it is more likely to produce outputs favourable to the individuals in that community (active representation). A way to reconcile bureaucracy with democracy.	Individual, department, organisation, government state.	Public Administration	Kingsley (1944), Krislov (1974), Long (1952), Thompson (1976), Van Riper (1958)	Smith and Fernandez (2017)
Agency Theory	Agency Theory is concerned with resolving problems that can exist in agency relationships due to unaligned goals or different aversion levels to risk.	Contract between principal and agent	Sociology	Eisenhardt (1898), Jensen and Meckling (1976)	Gelderman et al. (2015), Rehmatulla et al. (2017)
Resource-Based View (RBV)	RBV is an approach to achieve a competitive advantage through the use of valuable resources. These resources can be exploited by the firm to achieve a sustainable competitive advantage. RBV suggests that a firm should focus on the its resource strength more than environmental opportunities and threats.	The firm (as a bundle of resources and its processes to manage these resources)	Strategic Management	Barney (1991), Wernerfelt (1984)	Meehan et al. (2017)
Stakeholder theory	Stakeholder Theory suggests that the purpose of a business is to create as much value as possible for stakeholders. In order to succeed and be sustainable over time, executives must keep the interests of customers, suppliers, employees, communities and shareholders aligned and moving in the same direction.	Firm embedded in a network of stakeholders; shaped by external pressure	Organisational management and business ethics	Freeman (1984)	Gelderman et al. (2017)

The key theories shown in Table 4.13 have been imported from a range of other disciplines. This is likely explained by SPP being a relatively new and lacking its own theory base. Importing theories can help to support new topics of empirical research to be investigated (Flynn et al. 1990), although it can also bring inherited issues from any mother disciplines (Amundson 1998). It is also important to note that just as theories provide a lens through which to see, they also at times provide a way of *"not seeing"* as a researcher's focus becomes limited and framed (Van de Ven 1989). This must be considered when importing theories into a new topic or area, as it may restrict examination. The overall implication here is that the current body of knowledge within SPP literature is largely a-theoretical, providing scope to contribute to it by conducting theoretically informed research.

4.4.2 Themes

SLR RQ2: What are the key implementation themes that emerge from the SPP literature?

To understand how research into LCP can contribute to SPP literature, it is necessary to explore implementation themes in extant SPP literature. Themes were drawn from the literature through inductive coding which allowed the information to emerge from the dataset. After the coding of all 107 papers, three major themes emerged: drivers, enablers and barriers to implementation illustrated in Table 4.14.

Table 4.14. Major themes

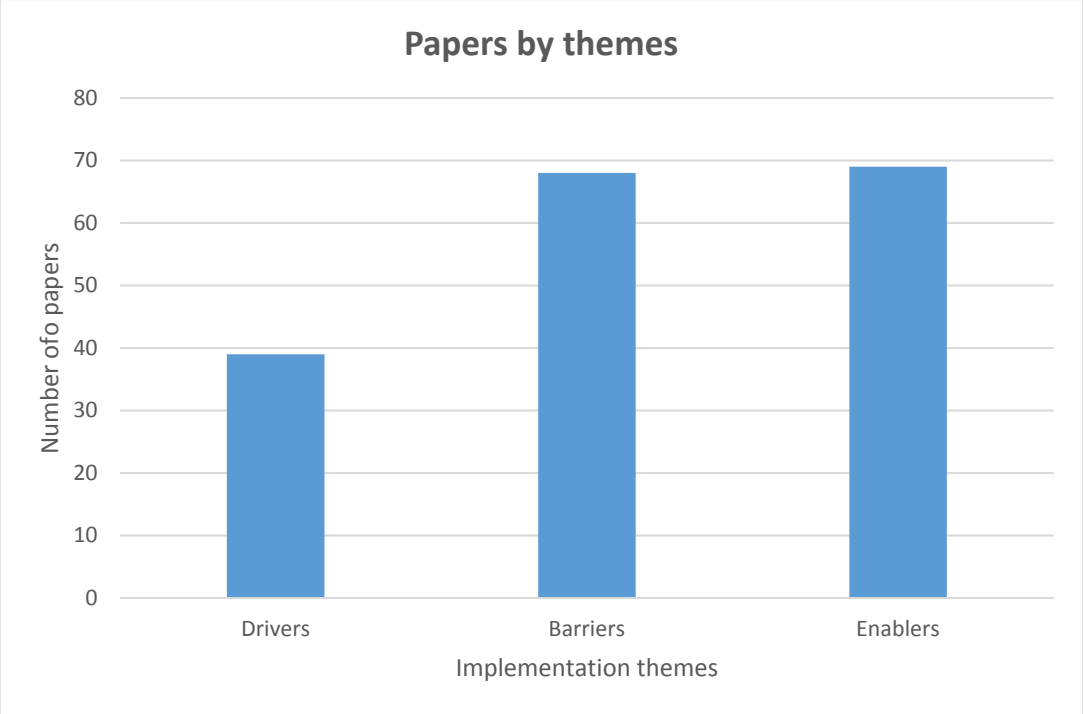
Themes	Description
Driver	Leading factors/components that initiate implementation.
Enabler	*''one that enables another to achieve an end''* i.e. to give it power (Gryzbowska 2012, p. 27)
Barrier	An obstacle which prevents or limits the way in which implementation takes place.

As SPP is an avenue for the implementation of sustainability, it was unsurprising that all of the 107 papers coded fell into at least one or more of these themes. Of the three themes, some papers addressed more than one theme, e.g. enablers and barriers (i.e. Walker and Brammer 2009). For this reason, the three themes appeared a total of 176 times within the 107 papers. The paper number by theme is displayed in Table 4.15 and formulated as a graph in Figure 4.5.

Table 4.15. Paper number and by themes

	Driver	Enabler	Barrier
Paper number	1, 2, 4, 9, 15, 17, 19, 21, 23, 25, 28, 29, 30, 31, 39, 42, 47, 48, 50, 51, 53, 57, 58, 59, 60, 61, 63, 65, 66, 67, 73, 80, 81, 91, 101, 102, 103, 105, 106,	1, 5, 6, 7, 8, 11, 14, 24, 26, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 42, 43, 44, 45, 46, 47, 48, 49, 50, 52, 53, 55, 56, 59, 61, 62, 63, 64, 67, 68, 69, 70, 71, 74, 75, 76, 77, 78, 79, 81, 83, 84, 86, 87, 88, 89, 90, 92, 93, 94, 95, 97, 99, 100, 101, 103, 104, 105, 106	1, 2, 3, 6, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 27, 28, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 43, 45, 48, 49, 50, 52, 53, 54, 55, 61, 62, 64, 65, 66, 68, 69, 70, 72, 73, 74, 75, 77, 79, 81, 82, 84, 85, 87, 88, 91, 94, 95, 96, 97, 98, 102, 107
Total	39	68	69

Figure 4.5. Papers by themes



The conclusion drawn here is that discussions of barriers and enablers predominate within this literature. This is perhaps due, in part, to the fact that drivers are taken for granted, whilst barriers and enablers emerge during implementation. To provide clarity on these major themes, inductive reasoning was employed to identify sub-themes and concepts that emerged from the papers, which were rich in data. Dominant sub-themes are listed below along with examples of papers in which they appeared.

Table 4.16. Implementation drivers

Concepts/ Themes	Description	Example of papers
Directives	A Directive is a legal act of the European Union which requires member states to achieve a particular result without dictating the means of achieving that result	Parikka-Alhola (2008), Thomson and Jackson (2007), Correia et al. (2014)
Legislation	A law or set of laws suggested by a government and made official by a parliament (e.g. Climate Change Act 2008)	Correia et al. (2013), Fet et al. (2011), Zhu et al. (2013)
Policy	A policy is a statement of intent and is implemented as a procedure or protocol. Policy merely guides actions toward those that are most likely to achieve a desired outcome. Can be set at different levels (e.g. EU, UK)	Li and Geiser (2005), Rimmington and Hawkins (2006), Amann et al. (2013)
Initiatives	Setting a priority. It is usually a description of the direction that will be taken and how that will make improvements (e.g. EU/Government initiatives)	Parikka-Alhola (2008), Diofazi and Valko (2014)
Leadership	The action of leading a group, people, an organisation or country, or the ability to do this through transition	Roman et al. (2017), Grandia et al. (2015b)
Individual Motivation	Motivation of individuals in the procurement decision-making process	Thomson and Jackson (2007), Trindade et al. (2017)
Regulations	Regulations have binding legal force throughout every member state and enter into force on a set date	Tsai (2017), Zhur et al. (2013)
Strategy	A plan of action designed to achieve a long-term or overall aim set at the EU, national level or local level	Murray (2000), Nash (2009)

The drivers of SPP are primarily coercive pressure through legislation, which is reflective of regulatory pressures identified within Institutional Theory (IT). A further observation is that these drivers operate on different levels. Whilst there is legislation listed, *'individual motivation'* is also reported as a driver for SPP. Table 4.17 presents a list of enablers.

Table 4.17. Implementation enablers

Concept/ Theme	Description	Example of papers
Procurement processes	*"Procurement process includes contractual requirement, well-thought out tender documents, pre-qualification clauses, conditions of purchases, qualifying processes, embedded procedures, developing specifications, whole life costing, invest to save."* (Walker and Brammer 2009, p. 134)	Walker and Brammer (2009)
Procurement policy tools	A suite of tools available to procurers to use during the procurement process to instil SPP (through a life-cycle approach)	Diofazi and Valko (2014), Testa et al. (2012)
Pre-qualification stage	Process of qualification during the procurement process. Increases contractual requirements, pre-qualification cases, qualifying procedures	Sporrong and Brochner (2009)
EMS request	Request of EMS during the tendering process	Testa et al. (2016), Fet (2010)
Environmental criteria	Environment criteria can be specified as an obligatory technical specification for the product or service (e.g. recyclable content of product) or they can be used as award criteria (Nissinen and Parikka-Alhola 2009, p. 1846)	Stofova and Szaryszova (2016), Bargues et al. (2017)
Life cycle costing/value	The use of life-cycle costing during procurement	Sourani and Sohail (2013), Iraldo et al. (2016),
Life cycle analysis	Using a life-cycle approach during the procurement process	Parrikka-Alhola and Nissinen (2012)
Supplier dialogue	Supplier dialogue during tendering, i.e. competitive tender to outline SPP preference	Chiarini and Vagnoni (2015)
Contract specification	Integrating sustainability requirements into the contract specification and conditions	Sourani and Sohail (2013)
Collaboration with suppliers	Collaboration/engagement with suppliers to implement SPP	Preuss (2009), Hall et al. (2016)
Ease of access to supplier	Easing access and improving the competitiveness of suppliers to support SPP	McMurray et al. (2014); Murrey (2000)
Management support	Top, mid-level and general support from management at an organisational level	Walker and Brammer (2009), Wong et al. (2016),
Organisational culture	Organisational culture encompasses values and behaviours that contribute to the unique social and psychological environment of an organisation	Trindade et al. (2017), Roman et al. (2017),
Conflicting priorities	Conflicting priorities within an organisation	McMurray et al. (2014)
Awareness	Awareness of SPP	Testa et al. (2016), Jaafar et al. (2016)

Interestingly, Walker and Brammer (2009) reported the *'procurement processes'* as one concept under enabler whereas authors such as Sporrong and Brochner, (2009) reported specific aspects such as 'pre-qualification' as an enabler. Table 4.18 makes that distinction thus highlighting the different interpretations made by researchers. The SLR dataset papers are primarily focused on identifying a list, presentation of drivers, enablers and/or barriers, rather than drawing a connection between them. The rationale maybe that procurement is a lengthy staged process, and that there may be several drivers, enablers and barriers located within it. Table 4.18 displays the barriers identified in the literature.

Table 4.18. Implementation barriers

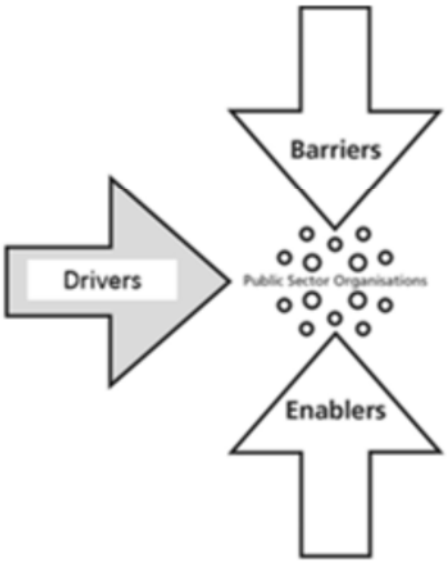
Concept/ Theme	Description	Example of papers
Cost/Price	Increased cost of SPP products	Brammer and Walker (2011), Kordestani et al. (2017)
Supply chain	Supply chain challenges to SPP implementation	Murrey (2000), Gelderman et al. (2015)
Lack of collaboration with suppliers	Lack of collaboration with direct supplier	Meehan and Bryde (2009), Chiarini and Vagnoni (2015)
Attitude/ Culture	Attitude/culture of procurement professionals	Hall and Purchase (2005), Walker and Brammer (2009)
Lack of Awareness	Lack of awareness of SD/SPP	Walker and Brammer (2009), McMurray et al. (2014)
Lack of awareness of policy	Awareness of policy supporting SPP	Walker and Brammer (2009)
Budgetary constraints	Financial/budgetary constraints on procurement activity	Nikolaou and Loizou (2015), Ashan and Rahman (2017)
Procurement process	Lengthy and complex, which means sustainability recommendations are not always continued	Warner and Ryall (2001)
Competing procurement priorities	Competing procurement objectives (.e.g. Quality vs SD)	Preuss (2011)
Lack of use of SPP procurement criteria	SPP not used in the procurement criteria	Chiarini and Vagnoni (2015)
Decentralised	Problems of coordinating activities across large/particularly decentralised organisations	Preuss (2011), Preuss and Walker (2011)
Lack of motivation	Lack of motivation with procurers	Walker and Brammer (2009), Preuss and Walker (2011)
Lack of knowledge	Lack of knowledge in SPP or procurement	Diofazi and Valko (2015), Ashan and Rahman (2017)
Lack of resources	Resources in terms of human resources, time, at organisational/team levels	Preuss and Walker (2011), Meehan and Bryde (2009)
Lack of top management support	Senior management not supporting SPP	Hall et al. (2016), McMurray et al. (2014)
Leadership	Lack of leadership within organisations	Ho et al. (2010), Chiarini and Vagnoni (2015)
Organisational culture	Wider organisational culture creating a barrier to SPP	Preuss (2009), Meehan and Bryde (2009)
Lack of skills	Lack of procurement skills and sustainability know-how	Sporrong and Brochner (2009), Akenroye (2013)
Tick-box	Tick-box behaviour where process is adhered to, but sustainability is not instilled.	Preuss and Walker (2011)
Lack of training	Lack of training to procurers	Preuss (2011) Testa et al. (2012), Ashan and Rahman (2017)

The papers examine different themes, which have been brought together in Figure 4.6.

Figure 4.6. Drivers, enablers and barriers illustration (Author)

Barriers		
Cost/Price	Budgetary constraints	Lack of resource
Supply chain	Procurement process	Lack of top management support
Lack of collaboration with suppliers	Competing procurement priorities	Leadership
Attitude/ Culture	Lack of use of SPP procurement criteria	Organisational culture
Lack of Awareness	Decentralised	Lack of skills
Lack of awareness of policy	Lack of motivation	Tick box culture
	Lack of knowledge	Lack of training

Drivers
Directives
Legislation
Policy
Initiatives
Leadership
Individual Motivation
Regulations
Strategy



Enablers	
Procurement processes	Contract specification
Procurement policy tools	Collaboration with suppliers
Pre-qual stage	Ease of access to supplier
EMS request	Management support
Environmental criteria	Organisational culture
Life cycle costing/value	Conflicting priorities
Life cycle analysis	Awareness
Supplier dialogue	

4.5 Implications

There are several conclusions that can be drawn from the analysis of the papers summarised in Figure 4.8. Drivers reported are predominately coercive and operate at a societal level, such as through legislation, suggesting that institutional theory will be important to understand them. The most prominent barriers in the SLR were the *'cost/price'* of SPP products and services and the procurement process itself. However, one could argue that *'perception of increased cost'* rather than actual *'cost'* is important here, as lack of knowledge and awareness were also identified as barriers. It is also worth noting that barriers and enablers may represent two sides of the same coin for specific concepts, for example *'lack of awareness'* (barrier) and *'awareness'* (enabler).

The SLR undertaken is useful for identifying the relevant drivers, barriers and enablers affecting SPP, but the a-theoretical nature of the field restricts the extent to which the literature explains how they operate and how they interact. The literature also does not explain whether the influences on SPP are identical for LCP or provide clear answers as to how they can be applied to successfully manage change. The enablers and barriers reported can be largely classified as organisational, individual or supplier oriented. Overall, these themes suggest that drivers, enablers and barriers operate on different levels, however the literature fails to explore this dimension. What can be taken away from the SLR is that SPP would benefit from further theory building and theory testing. Moreover, this SLR can serve as an avenue through which to investigate the drivers, barriers and enablers to the implementation of LCP, for the express purpose of implementing changes based on these findings. Resultantly, three research questions (RQ) were derived to explore LCP further and are displayed in Table 4.19.

Table 4.19. Research questions

Cycle	Research Questions
Two	RQ2: What are the major drivers of LCP within the public sector, and how do they operate? RQ3: What are the major barriers and enablers of LCP within the public sector, and how do they operate and interact?
Three	RQ4: How can LCP within the public sector be managed to improve chances of successful adoption and extension?

4.1.1 Theoretical lens: institutional theory

What stands out from the list of drivers, enablers and barriers to the implementation of SPP is the strong presence of Institutional Theory (IT) that underpins much of the list presented. For that reason, IT is adopted as the principal theoretical framework for the research. This section provides an overview of IT and how it operates, before examining the application within procurement and sustainability literature. To begin, Kraft and Furlong's (2007, p. 41) book, on public policy views institutional theory in the perspective of "*Policy-making that emphasizes the formal and legal aspects of government structures*." Institutional theory has to-date dominated the literature on sustainability drivers (Grob and Benn 2014). Furthermore, Roman (2017), notes that institutionalising sustainability within public sector organisations provides an illustration of the theory in action. Scott (2001, p. 48) in the book *'Institutions and organization'* asserts that *"Institutions are social structures that have attained a high degree of resilience".* However, IT is deeper and more resilient and has become part of daily life, it can nevertheless resonate with formal institutions, such as Higher Education where individuals are there for a *'specific purpose'* not just informal institutions (Scott 2014). Rolfham, (2009, p. 352) explains, institutions are vital as *"without institutions a social system would not be able to accumulate knowledge or enable communication and would therefore be unable to sustain innovation"*. There is no universally agreed definition of *'institutions'* among scholars. North (1990, p. 3) explains that institutions are humanly devised rules in a society that shape human interactions, and in a sense operate as the *"rules of the game"*. Whereas alternative definition cites *"institutions* as *systems of established and prevalent social rules that structure social interaction"* (Hodgson 2006, p. 2), or as a *"set of habits, routines, rules, norms and laws, which regulate the relationship between people and shape human interaction"* (Johnson 1992, p. 26). Scott (1995) combined *'institutions'* and *'organisations'* together and presented the three concepts, pillars of institutions, which are displayed in Table 4.20.

Table 4.20. Three pillars of institutions (Scott 1995, p. 60)

Theory element	Regulative	Normative	Cognitive
Basis of compliance	Expedience	Social Obligation	Taken for granted
Mechanisms	Coercive	Normative	Mimetic
Logic	Instrumentality	Appropriateness	Orthodoxy
Indicators	Rules, laws, sanctions	Certification, accreditation	Prevalence, isomorphism
Basis of legitimacy	Legally sanctioned	Morally governed	Culturally supported, conceptually correct

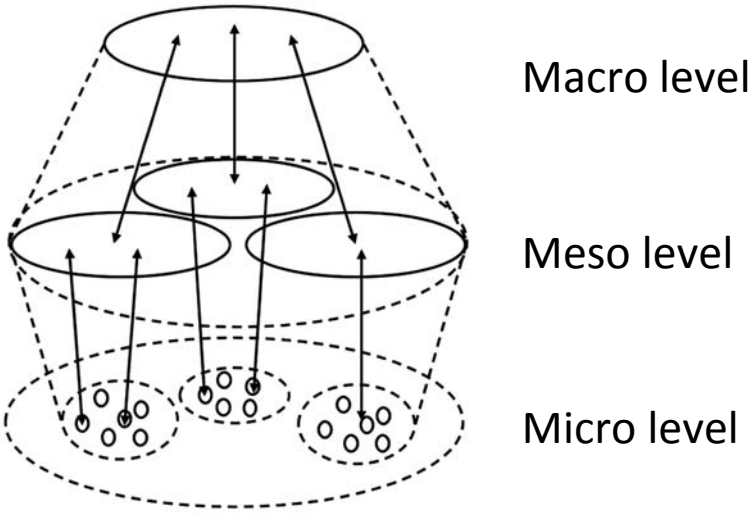
For Meyer and Rowan (1977), formal organisational structures serve as a symbol or element whose primary purpose is to signify attributes instead of accomplishing actual results. Grob and Benn (2014, p. 13) note that IT *"provides some explanation of the mechanisms and programs that spread sustainable procurement across organisational groups as it looks to explain homogenisation"*. DiMaggio and Powell (1983) note that institutional pressure improves the homogeneity of the organisational structures within any institution. Isomorphism refers to the degree of homogeneity between organisations caused by international of external influences (Ashworth et al. 2009). Scott (1995) indicates that, in order to survive, organisations and individuals must conform to the prevailing rules and belief systems in the wider environment (DiMaggio and Powell 1983; Meyer and Rowan 1977), because institutional isomorphism, whether structural or procedural, earns the organisation legitimacy (Deephouse 1996; Suchman 1995). Isomorphism is recognised as *"containing process that forces one unit of population to resemble other units that face the same environment pressure'* (DiMaggio and Powell 1983, p. 149). Grob and Benn (2014, p. 13) outline the three key constructs:

(1) coercive isomorphism, defined as that form of isomorphism that stems from political influence and the problem of legitimacy;
(2) mimetic isomorphism stemming from standard responses to uncertainty;
(3) normative isomorphism associated with professionalisation.

Patterns of practice, and the assumptions, beliefs and values that underpin the meaning of legitimate practices, are referred to as institutional logics (Thornton and Ocasio 1999). In Cycle One and the SLR, regulative (coercive) pressures were identified through formal rules or laws, given these findings, IT will be used as a primary frame through which to investigate drivers, as well as being used to understand barriers and enablers. Findings will be related to the corresponding pillar of IT (i.e. regulative, normative and cognitive). Other theories and factors will be explored, should they arise, through abduction in Cycle Two.

4.1.2 Multi-level analysis

The results of the SLR also indicated the factors influencing SPP that operate at three distinct levels: Macro (societal perspective, e.g. regulation), Meso (organisational and group perspective) and Micro (i.e. individual interest).



Although the SPP literature benefits greatly from contributions at all these levels individually, there is a relative dearth in the literature of multi-level analyses of data from different stakeholders either around or directly involved in procurement. In fact, there are currently only three papers within SPP literature that conduct multi-level analyses. Preuss and Walker (2011), examined SPP barriers (i.e. individual and organisational). Guenther et al. (2013), studied multi-level barriers (i.e. individual, group/organisation and external). Trindade (2017), paper number 105, recently developed a toolkit for SPP implementation (organisational level, regime, landscape). Evidently, conducting a multi-level analysis from different perspectives is challenging, but yet it is hoped that the benefits will far outweigh the drawbacks.

4.6 Summary and Conclusion

This chapter consisted of a SLR of SPP literature that helped to establish the contribution that a study into LCP could make to the field. The chapter begun with an overview of the chapter, before proceeding to outline the SLR research questions. It was highlighted that this SLR was the first of its kind for SPP. Descriptive information and analysis were then presented pertaining to the research protocol, outlining the search terms that were used in the Scopus database. The chapter then proceeded to delineate the criteria for the selection of papers

and a discussion of how they were categorised, before analysing them in relation to the research questions. Two SLR research questions were then answered. Conclusions were drawn along with a discussion of how the research could contribute to the field. One key finding pertained to the fact that the field of SPP is predominantly a-theoretical with respect to both theory testing and building. In addition to this, drivers, enablers and barriers in the extant SPP literature does not clarify whether they are the same for LCP, due to the fact that LCP is an emerging concept. This afforded an opportunity for the present research to contribute to theory testing and/or building by exploring the drivers, barriers and enablers of LCP. It was noted that there are opportunities to apply IT as a principal theoretical lens through which to understand LCP, whilst other theories and factors will also be explored, should they arise, through abduction. Moreover, although there may be connections between drivers, enablers and barriers in terms of where they operate (i.e. Macro, Meso, Micro) and interact, extant SPP literature has hitherto not examined these interconnections. This presents a further opportunity for a multi-level analysis to explore how they operate and interact. The chapter concluded by acknowledging that papers have thus far failed to go beyond and engender change, which provides an additional avenue through which this research can contribute to the field.

The key point to take away from this chapter is that LCP within the sub-discipline of SPP has hitherto been relatively unexplored in academia, and, as such, warrants further exploratory research in order to broaden the scope of the existing body of literature on SPP. Specifically, there is a need to conduct a multi-level perspective and adopt a theoretical framework to understand the drivers, barriers and enablers to LCP and examine where they operate and interact. The next chapter outlines the methodology and the chosen research design adopted in the present study.

5 Methodology and Research Design

5.1 Introduction

This chapter outlines the methodological approach and the research design adopted in the thesis. The chapter is divided into two parts. The first section entitled *'methodology'* will address the philosophical underpinnings of the methodology, as well as the approaches and strategies that were utilised. This section will provide a rationale for the adoption of a pragmatic philosophy and an abductive approach, as well as justifying utilising Action Research (AR) as a research strategy. The second section entitled *'research design'* explains the modes of data collection and methods, recruitment procedures, data analysis, the role of the researcher, issues pertaining to the field, and aspects of quality. Over the course of this section, consideration will also be given to extant SPP literature identified in the SLR and the research setting.

Prior to discussing the specifics of the methodology and research design, it is noteworthy to mention Cycle One, although included in the thesis due to its importance, was a preliminary study conducted in collaboration with CCCW. This thesis is therefore presented with three distinct research cycles that address four research questions. As will be discussed in due course, these cycles and research questions organically evolved through the course of the research. While, traditionally speaking, theses adopt a linear format towards answering research questions, this thesis adopted an AR iterative process, and, as such, developed research questions over the course of these cycles. Although this does present some challenges when writing a chapter of this kind, the author endeavours to present this discussion in as logical a format as possible. To reiterate, the four research questions have been presented across the three cycles in Table 5.1.

Table 5.1. Research questions against three cycles of research

Cycle	Research Questions
One	RQ1: How is carbon considered in the procurement process?
Two	RQ2: What are the major drivers of LCP within the public sector, and how do they operate? RQ3: What are the major barriers and enablers of LCP within the public sector, and how do they operate and interact?
Three	RQ4: How can practical interventions enable the transition towards the effective implementation of LCP?

Please note that the research question for Cycle Three evolved out of the original question: *"How can LCP within the public sector be managed to improve chances of successful adoption and extension?"* This was developed into a more specific question: *"How can practical interventions enable the transition towards the effective implementation of LCP?".* This shift occurred as a direct result of the findings of Cycle Two. The discussion of methodology begins with exploring the research philosophy that underpins the research.

5.2 Methodology

5.2.1 Research Philosophy

According to Hunt and Hansen (2011), the philosophical approach that one adopts constitutes a fundamental component of the research process, insofar as it shapes the assumptions of the researcher and directly informs one's methodological choices. As noted by scholars (Crotty 1998; Saunders et al. 2012), philosophy encompasses multiple aspects of the research process, including underpinning the research design (Crotty 1998), and framing the development and nature of the knowledge that one attempts to gather. Moreover, a researcher's philosophy is deemed to be a *'central pillar'* (Baldwin 2014, p. 3) because it drives the interrogative processes that generate research questions and inform the research. Thomas (2004, p. 35) argues that philosophy concerns itself with the most fundamental questions pertaining to the nature of knowledge, reality and existence, which constitutes the so-called *'research paradigm'*. The term *'research paradigm'* derives from the work of Kuhn (1962, p. 45), who outlined the key differences between the natural and social sciences, who defined it as *"the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed"*.

The key components of a researcher's philosophy are ontology, epistemology and axiology. Ontology and epistemology centre on what the researcher can know, how they gain knowledge (Denzin and Lincoln 2011; Howell 2013), and how they position themselves in relation to this knowledge, which directly informs their methodological choices (Saunders et al. 2012). These are assumptions that derive from distinct worldviews (Tang 2011). Ontological and epistemological assumptions can often be closely intertwined (Thomas 2004), but also distinct from one another. Ontology refers to an individual's existing assumptions about reality and how they view the world (Baldwin 2014). Ontology is concerned with *'what is'*, that is, the nature of existence and the structure of reality itself (Crotty 2007). Saunders (2012) delineates that ontology is often discussed in terms of

objectivism and subjectivism. Objectivism adopts the stance that things, social entities, exist as a meaningful reality external to the social actors concerned with their existence (Crotty 1998). Crotty (2007, p. 8) defines epistemology as *"a way of understanding and explaining how we know what we know"*. This explains what basis our claim to knowledge is legitimate and adequate (Maynard 1994). The focus here is on the way in which the researcher believes knowledge is gained. In contrast, axiology is concerned with a researcher's values (Saunders et al. 2012, p. 129), more specifically, how these values impact upon the research. Heron (1996) explains that values are the guiding principle of all human action. The following reflective entry represents the author's own philosophical stance.

Authors Philosophical Statement

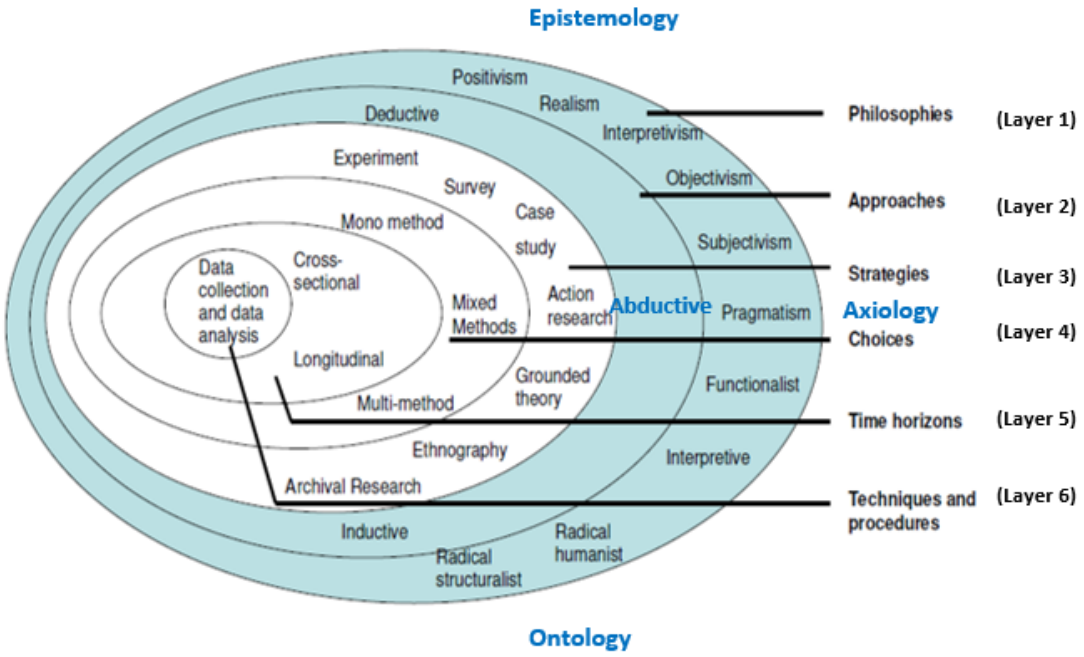
I value the environment and society as a whole. I believe we as individuals have a level of responsibility to the world, society, environment, and future generations. I also believe in the importance of leadership by individuals, even at its smallest element. I feel fortunate that I am in a position to give back to society through this research. I believe in societal harmony, tolerance, looking after your neighbour, taking responsibility and using your time on this earth to benefit others. I accept that multiple realities, norms and cultural practices exist, and understand that interpretations can differ significantly. This is apparent in the level of disharmony one witnesses in the world today, which, paradoxically, persists despite the fact that societal norms and values promote harmony and peace as opposed to war.

With little previous experience in the public sector prior to this thesis, I can honestly say that I initially lacked interest in conducting research within this sector. In retrospect, this was due to my lack of understanding of the civil sector and the integral role it plays in society.

I value the importance of discourse and believe that through positive engagement pragmatic action can be taken to unlock difficult situations. At heart, I am an optimist and firm believer in being flexible and adaptable to the unexpected challenges and hurdles that inevitably arise. I believe that research must have practical relevance and that practical situations require research. Theory and practice should thus work hand-in-hand.

To promote a greater understanding of philosophical and methodological aspects of research, Saunders et al. (2007; 2012) developed a model known as *'the research onion'*. The model is one of many conceptual models that demonstrate the key philosophical paradigms and methodological choices available to researchers. Saunders et al's. (2007) conceptual model is chosen for its ease of design and the digestible way it presents the key components of philosophical research. Although Saunders et al. updated their model in 2012, the original 2007 model is adopted in this research due its better alignment with the subject matter. Saunders et al's. (2007) model is adapted and presented in Figure 5.1.

Figure 5.1. Research Onion



Source: Adapted from Saunders et al. (2007)

This conceptual model demonstrates the inter-connectivity of philosophical positions all the way down to data collection in a way that can be applied to most forms of research. One's ontological, epistemological and axiological stances are associated with different philosophical paradigms and underpin the model. The model has six distinct layers which have been labelled 1 to 6 by the author. Layers one, two and three are chronologically discussed in the methodology section, while layers four, five and six are applied within the research design section of this chapter.

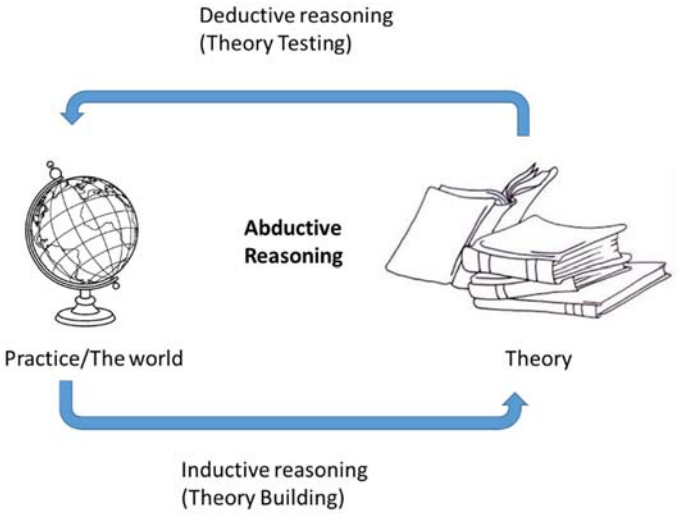
5.2.2 Philosophical perspective: Pragmatism

Layer one of the model outlines the different philosophical paradigms. The philosophical paradigm adopted in this thesis is pragmatism, which was chosen due to its close alignment with the author's own philosophical worldview. Pragmatism, as a philosophical perspective, originated around 1870 in the work of Peirce, James, Mead, and Dewey (Cherryholmes 1992). Subsequently, other researchers such as Cherryholmes (1992), Murphy (1990), Patton (1990) and Rorty (1990) have developed pragmatist philosophy. A key tenet of pragmatism is that reality is constantly renegotiated, debated and interpreted (Crotty 1998). Consequently, the focus here is less on methods and more on solving the actual problem by utilising all the viable approaches available (Gray 2009; Patton 1990; Rossman and Wilson 1985). Creswell (2008, p. 10) posits that *"pragmatism is not committed to any one system of philosophy and reality"*, which demonstrates the flexibility of the approach. According to Creswell (2008, p. 11), AR *"researchers are free to choose the methods, techniques, and procedures of research that best meet their needs and purposes."* Moreover, Creswell (2008) opines that pragmatists view research as occurring in a social, historical and political context. Another key issue is time, in the sense that things change over time and are thus constantly in a process of renegotiation. A pragmatist approach is also underpinned by the conviction that concepts are only relevant insofar as they support action and are focused on concrete situations and real consequences (Cresswell 2008; Keleman and Rumen 2008). This is important because it stresses that ideas and practices are only valuable insofar as they have a use and are workable and practical (Reason 2003; Ormerod 2006; Creswell 2008). The author's own pragmatic approach in this research was profoundly informed by the research setting, reflection, usefulness, cycles of inquiry, the available resources, practical time constraints, accessibility and whether a need existed to pursue these lines of inquiry.

5.2.3 Research Approach: Abduction

Layer two of Saunders et al.'s (2007) model lists research *'approaches'*, which are underpinned by the researcher's philosophical stance. According to Saunders et al. (2012) there are three main research approaches: *'deductive'* - i.e. moving from theory to data; *'inductive'* - i.e. moving from data to theory; and *'abductive'* which combines the two. Figure 5.2 presents these three approaches within a single diagram.

Figure 5.2. Abductive reasoning overview



Source: Author

A deductive approach invariably begins with theoretical considerations, before proceeding to formulate hypotheses, collect data, engage in hypothesis testing, and then conclude by either confirming or rejecting the hypotheses (Walliman 2006). A deductive approach is often employed in quantitative research (Bryman and Bell 2007) and associated with a positivist stance. In contrast, an inductive approach sets out from specific observations, which form the basis of tentative propositions. Hence, an inductive approach is often used in qualitative research (Bryman and Bell 2007; Copi et al. 2016). Charles Sanders Peirce (1839-1914), one of the seminal pragmatist scholars, investigated the long-established inductive and deductive models of logical thinking within the philosophy of science, before advancing his own alternative approach which he called *'abduction'* (Fircher 2001). Abductive reasoning is an iterative process which moves between data and theory. Saunders et al. (2012, p. 150) explain, *"with abduction, data is used to explore a phenomenon, identify themes and explain patterns, to generate a new or modify an existing theory which is subsequently tested, often through additional data collection."* Abductive reason has been adopted for this thesis as it provides an element of flexibility allowing the author to move between theory and data, or data to theory or both depending on the findings.

5.2.4 Research Strategy: AR

Layer three of Saunders et al.'s (2007) model outlines the available research *'strategies'*. Of these, four potential research strategies are considered which align with Saunders et al's. (2007) *'research onion'* and the author's own philosophical position: case studies; AR;

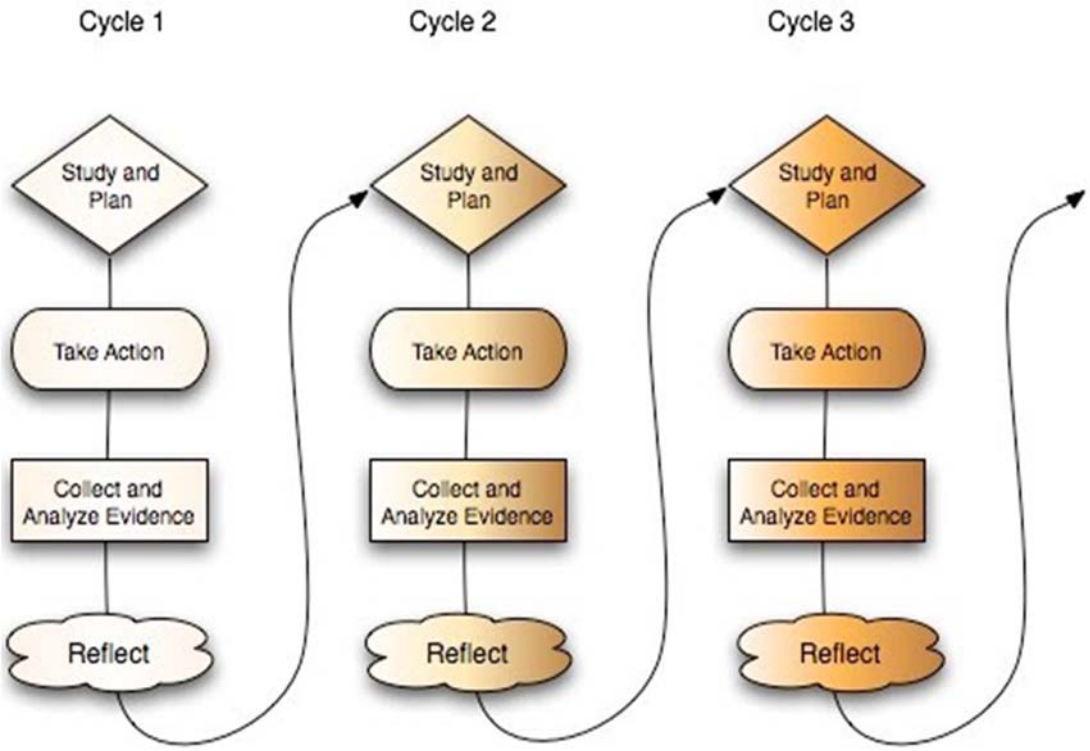
grounded theory; and ethnography. Appendix G provides a critical evaluation of each of these research strategies, identifying their respective strengths and limitations. AR was selected due to its alignment with the author's pragmatic philosophical orientation and its suitability for the research setting. Kurt Lewin, a social psychologist, coined the term AR in 1944 to describe a specific form of inquiry. Lewin (1952, p. 564) notes that AR is comprised of *"a circle of 'planning', 'action' and 'fact finding' about the result of the action"* (Lewin 1946, p. 205), and McNiff and Whitemead (2011, p. 34) explain that *"AR is done by practitioners who regard themselves as agents."* AR involves collaboration and iterative, emergent cycles of inquiry. As part of this process, the researcher must become an insider, see themselves as part of the context that they are investigating (McNiff and Whitemead 2011), and draw on different forms of knowledge (Coghlan and Brannick 2010; Reason 2006; Reason and Bradbury 2008; Shani and Pasmore 1985). This ethos is reflective of the research conducted in Cycle One and is in accordance with how access was obtained, and the data was collected. This is important because the richness of the data gathered in Cycle One directly informed the direction of Cycle Two into the public sector. Within the SLR dataset (see Chapter Four), only Uttam and Roos (2015) adopted AR. A general observation is that the field of SPP is dominated by surveys, case studies and secondary data analysis (Walker and Brammer 2009). This raises the question of why AR has hitherto not been adopted much in SPP and its related sub-disciplines. Knight et al. (2016, p. 243) posit that novel research strategies, such as AR, though subject to both systemic and individual barriers can offer *novel "perspectives, methodologies, and data collection and analysis techniques are needed in PSM research, both to push the boundaries of the field and enhance the quality of research within the field."* As aforesaid, the present research aims to adopt a novel approach, specifically AR, to offer new insights into SPP with focus on LCP within public sector.

The flexibility that AR offers is expedient for this research as it allows methodological choices to be made that fit the specific research setting and allows reflection to be a critical part of the process. This is important because it allowed the author, during the research, to develop a study which is needed in Wales at a historical juncture in the public sector. This supports McNiff and Whitemead's (2011, p. 8) argument about the strengths of AR that *"if they [the researchers] feel something needs improving, they work on that aspect, keeping records and reproducing regularly oral and written progress reports about what they are doing."*

Cycles of inquiry

A fundamental aspect of AR is the action-reflection cycle (McNiff 2013). Lewis (1946, p. 38) first defined this cycle as *"a spiral of steps, each of which is composed of a circle of planning, acting and fact finding about the results of the action"*. Since 1946, there have been a number of definitions and explanations. Having said this, the fundamental principle of a cycle still exists (see Elliott 1991, p. 71; Carr and Kemmis 1986). This *'plan'*, *'act'*, *'observe'* and *'reflect'* process has been adopted in this research which involves three cycles. Figure 5.3 outlines Riel's (2010) four steps, cycle-by-cycle.

Figure 5.3. Progressive problem solving with AR



Although Figure 5.3 presents a useful illustration in theory, things may not always sequentially occur in this way in practice, and, indeed, as Carr and Kemmi (1986) note, there is always a case that cycles may overlap and become disjointed and messy in the real life setting. Additionally, Elliot (1991) and Riel (2010) elaborate on this, explaining that a cycle

does not need to be fully evaluated before one proceeds to the next cycle. McNiff (2013, p. 66) produced a diagram illustrating the evolution through the cycles, presented in Figure 5.4.

Figure 5.4. Generative transformational evolutionary process

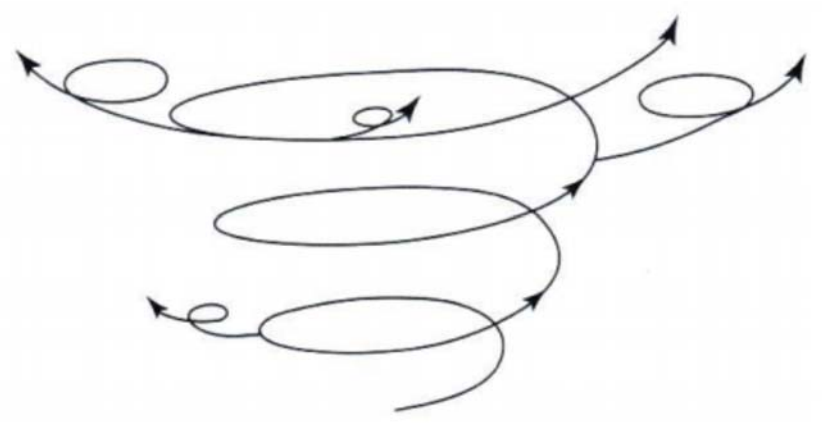


Figure 5.4 represents an accurate reflection of this study throughout the cycles of inquiry, with off-shoot cycles occurring (e.g. WAG arranging support and research for SME following Cycle One recommendations), and the time overlap between Cycle Two and Three. To mitigate this *'messy'* process, AR *'Principles in Planning'* (McNiff 2013, pp. 90-91) were adopted and objectives were drafted for each cycle, as illustrated in Table 5.2.

Table 5.2. AR planning process

Principles: AR process (McNiff 2013, p. 91)	Application (Cycle One)
What do I wish to investigate?	LCP in Wales
Why do I wish to investigate it?	To identify and understand what is happening in different sectors in light of the 10% increase in carbon.
How do I show and describe the current situation as it is?	Use interviews, reflection and secondary data as the starting point.
What do I think I can do about it? What will I do about it?	Continue the research in the public sector to understand the implementation of LCP. Present ideas to others and explain how a study of LCP in the public sector can contribute to practice and literature.
How will I ensure that any conclusions I draw are reasonably fair and accurate, by inviting critical responses from myself and others?	Keep a reflective diary Present findings to specialists in academia, policymakers and procurers in the field to get feedback and advice. Seek peer-review.
How do I communicate the significance of what I am doing?	Publish a government White Paper to WAG (see Begum et al. 2016a). IPSERA conference presentation.
How will I modify my practices and thinking in light of the evaluation?	Shift focus to Cycle Two and focus on the public sector and adopt suitable methods as and when the situation requires it. Aim to get deeper insight into the public sector to understand the implementation of LCP.

To obtain accurate findings, appropriate methods of data capture had to be selected. Although the research appears to be organic and fluid, parameters and limitations nevertheless had to be set to avoid the research becoming drowned in data. To provide this systematic rigour, the author, through recourse to a pragmatic approach, took stock of the findings at the end of each cycle, made deep reflective observations and strategically planned the next course of action to ensure the methods selected were still appropriate. Ultimately, as recognised by Reason and Bradbury (2008), the needs of the research were dictated by the findings of the earlier cycles and the specificity of the research setting. The eventual modes of data capture used were semi structured interviews, observations, workshops, and secondary data analysis, outlined in Table 5.3, which was formulated from descriptions gathered from Saunders et al (2012) and Thomas (2004).

Table 5.3. Method choices

Methods	Description	Reason for choices
Semi-structured interviews	Combines pre-determined open questions (questions that prompt discussion) with the opportunity for the researcher to explore particular themes or probe for explanation or elaboration.	This method allowed for the flexibility that was required during the first two cycles. At the time of selection, deeper investigation was required. This method is suitable for an abductive approach as it offers the flexibility to update or amend questions through the research cycles.
Observations	Direct first-hand observations by the researcher.	Making and recording observations was important in the study for gaining an understanding of LCP and the changes as and when they took place. These contemporaneous notes provided valuable insights later when reviewing and reflecting upon the findings. This method aligned with the emphasis on reflection within AR. This is an ongoing method that can be fitted around interviews, attending meetings, attending sector events, and is an easy method in that it requires little preparation.
Workshops	Where a small group (5-16 participants) engage in intensive discussion and activity around a subject or project over a short period of time. The Researcher acts as a facilitator.	Although demanding, a workshop is a creative way to gather data in a short space of time, which was needed for the final cycle (Cycle Three). This method placed participants together in one place which allowed the author to engage with them, share knowledge and obtain answers which was needed for the final cycle. The method allowed participants to engage with each other and the researcher. It allowed for the discussions to be self-contained and measured. It was suitable because collaboration was needed within the time constraints of the research. This method is flexible and aligns with pragmatism and AR. It provided a platform to implement and measure change.
Secondary data analysis	Where secondary data is analysed and interpreted by the researcher to give voice and meaning around an assessment topic. Analysing secondary data codes, the data into themes	It was selected as a means through which to triangulate the data collected through all the cycles. Some documents are readily available, such as government publications, policy information. Access to some data was not always forthcoming.

This section has provided a detailed rationale of why the research is grounded in a pragmatic philosophy, and why the author adopted an abductive approach by using AR. Although, as aforementioned, there is scarce research using AR in SPP literature, this chapter has demonstrated why AR represents a dynamic strategy through which to obtain rich data in a flexible, abductive and pragmatic manner in a live and active setting (Bradbury and Reason 2008). Moreover, this chapter has argued that AR allows researchers to address the lacuna in current literature pertaining to engendering change, a position which is consistent with the author's own philosophical stance and pragmatic ideology. AR enables researchers to make a positive contribution towards engendering change in the research setting, as illustrated by the fact that Cycle One of the research, directly informed the focus on the Welsh public sector in the subsequent cycles. The second part of the chapter explains the chosen research design.

5.3 Research Design

This part of the chapter is dedicated to delineating the research design. This research adopts an AR strategy which is far from linear in that it involves distinct methods of data collection across three cycles of inquiry. Accordingly, the research design was constantly evolving in relation to various factors, such as time, the participants, the research setting and the results emerging out of each cycle. For ease of reference, the research design section is presented in a conventional linear manner and addresses the following: data collection and methods; recruitment of participants; data analysis; the researcher; practical dimensions; and aspects of quality. Whilst the author will present the three cycles independently, there will inevitably be some overlap and repetition due to the evolutionary nature of AR. The research involved three AR cycles that addressed four questions. These are presented in Table 5.4 which includes the unit of analysis, duration and methods adopted.

Table 5.4. Breakdown of participants by cycles

Cycle	Participants	Research questions	Unit of analysis	Duration	Method adopted
One	12	RQ1: How is carbon considered in the procurement process?	Sectors (Public, Private, Third)	Mar2015 – Feb2016	Semi-structured Interviews, Research diary, Secondary data analysis, Direct observations
Two	34	RQ2: What are the major drivers of LCP within the public sector, and how do they operate? RQ3: What are the major barriers and enablers of LCP within the public sector, and how do they operate and interact?	Public Sector	Mar2016 – Dec2016	Semi-structured interviews, Research diary, Secondary data analysis, Direct observations
Three	18	RQ4: How can practical interventions enable the transition towards the effective implementation of LCP?	Group	Sept2016 – Oct2017	Workshops, Research diary, Secondary data analysis, Direct observations

5.3.1 Data collection and methods

At each stage of the research, appropriate methods were selected according to their suitability. The selected methods from each stage are presented in Table 5.5, which is distinct from Table 5.4 insofar as it details how the different methods were applied in the research setting.

Table 5.5. Applied methods

Method	Cycles	Application
Semi-structured interviews	Cycle 1	Across three sectors as an exploratory exercise through which to understand how carbon is considered within the procurement process. Interview protocol is included in Appendix C.
	Cycle 2	Public sector procurement organisations and supporting organisations in Wales interviewed. Focused on the drivers, enablers and barriers to the implementation of LCP. Interview protocol is included in Appendix H.
Workshops	Cycle 3	Workshops focused on engaging participants and sharing knowledge to engender change. Cycle Three evolved from the cumulative findings of Cycle One and Two. Workshops targeted to Category Management Team and other staff involved in procurement. Workshops were used to record level of knowledge before, during, directly after and then 12 months after to see if change had taken place.
Direct observation and reflection (recorded in Research diary)	All Cycles	The diary records of observations, experiences, ideas and thoughts, personal change experienced, key decisions, personal emotions and reflection. Observations made from meetings with VW, CCCW, FGCO. Observations made at events including: Fit Cymru Introduction Event (September 2016) Addressing Poverty through the Welsh Supply Chain (September 2016) National Procurement Awards Ceremony 2016 (Bangor) Shared Learning Event on 'Working Towards the Goals of a Sustainable Wales' (February 2016) Interview venues (before, during and after interviews) Workshop observations (i.e. conversations during breaks)
Secondary data analysis	Cycles 1 and 2	Sustainability Risk Assessment tool; Community Benefits tool; Supplier Qualification Information Database (SQuiD); Sustainable Procurement Assessment Framework (SPAF); Procurement Fitness check (sample); Maturity Model; Environment (Wales) Act 2016; Well-being of Future Generations (Wales) Act 2015; Public procurement policy guidelines; EU Procurement regulations; Green Dragon awards guidelines; ISO14001 certification guideline; ISO9001 certification guidelines; BS8555 certification guidelines; NHS Shared Services (website pages); Resource Efficient Wales Framework guidelines; Sustainable Development Charter; Stern Review (2006); Climate Change Act (2008); Leadership Report. Wales and Sustainable Development: A Reference Compendium (2005); Leadership Report. Wales - Sustainable Development and Leadership: An Essay; Organisation information at interview sites (i.e. leaflets); Websites of all participant organisational website (where available).

Using a variety of methods offers the ability to triangulate data and stay flexible to the need of the research setting, to gain a deeper understanding of the implementation of LCP (Yin 2014). Two of the key methods chosen were semi-structured interviews (Cycles One and Two) and workshops (Cycle Three).

Semi-structured interviews

Although the author had prior experience of interviewing, a training course on interviewing skills was also completed before entering the field. Participant interviews were designed to take between forty-five minutes to an hour each. Conducting semi-structured interviews helped to keep the participants focused on the core themes, whilst still providing flexibility to explore new themes which emerged during the interview and gain a deeper understanding of the issue. Having said this, it was important to maintain consistency across the interviews and to ensure that the key themes were prioritised. Semi-structured interviews also helped to build rapport since it allowed participants to express themselves more openly, which would not have been the case with fixed close-ended questions. In contrast, the interview questions were predominately open and exploratory in nature, which meant that additional probing questions could be used when appropriate. This fluid approach, as Charmaz (2006) notes, enables in-depth explanations and a deeper understanding of the real underlying issues. As new themes emerged, reflection and adaptations could take place; for example, the interview protocol and code book were modified when required, which is in accordance with the adopted pragmatic ideology and AR strategy.

Workshops

The workshops in Cycle Three were designed to understand how a practical intervention (i.e. workshop) could engender change and thus enable the transition towards the effective implementation of LCP. Pavelin et al.'s (2014) framework was used to create the interactive workshops, which can be found in Table 5.6.

Table 5.6. Framework for interactive workshops

Rules	Researchers comments
1. Decide whether an interactive workshop is the right choice	Interactive workshop was suitable as it allowed a route to intervene and engage. Discussed options with Vice President of the Sustainability and chair of the internal Sustainability Group at NHS to explore options. Final decision was made to use interactive workshops.
2. Choose participants carefully	Three people were used to select suitable participants reviewing background and procurement activity.
3. Identify suitable activity	All activities were designed bespoke for workshops focused on procurement including life-cycle analysis, connecting to sustainability tools, hotspots and implementing change in procurement activity.
4. Identify facilitators and brief them	Reviewed this option. Not required for workshop.
5. Consider logistics, facilities and how to record outcomes	Sibbet (2010) encourages the use of graphics, sticky notes, idea mapping as part of engagement. PowerPoint, Flip charts, pens, Post-IT notes used for workshop. Professional setting e.g hotel, refreshments available, locally accessible.
6. Plan the agenda	Used *'opening'* (generate ideas), *'exploring'* (finding patterns), and *'closing'* (evaluating) (Gray et al 2010).
7. Market your interactive workshop as a networking opportunity	Informed participants the workshop was also an opportunity to share idea and network within NHS Wales.
8. Get the best from participants	Participants encouraged to work together (in pairs), share ideas with each other and the workshop group. Warm up used (Pavelin 2014), ice breakers used to gather information about knowledge levels, which were also used to tailor the workshops. Cards were provided to participant to complete, to identify needs. Artefact used i.e. globe of the world to demonstrate global warming. Aware reflective individuals may find on the spot thinking uncomfortable (Brigg 1995) therefore agenda and activities were shared in advance of workshop to allow people to prepare.
9. Follow up with your facilitators and create a post-workshop report	Not required for workshop. However, followed up with NHS management to obtain feedback post workshop.
10. Follow up with your participants	Followed up participants 12 months after to understand if any impact has been made.

The workshops were interactive and allowed the participants to speak openly and feel comfortable. A neutral professional setting (Holiday Inn Hotel, Cardiff) was selected, and the author was presented as neutral. The importance of a neutral approach and setting was also identified during Cycles One and Two, as documented in the reflective research diary. The workshops were also promoted as interactive professional development workshops. A range

of refreshments were made available to the participants, and the author used physical and visual tools to help facilitate the discussions, such as PowerPoint slides, a *'globe'* ornament, flip charts, Post-IT notes, video and cards. The author debriefed the participants about the research and explained the focus of the workshops.

Workshops were broken down into two, three-hour sessions (a total of six hours). In total there was eighteen participants attended the workshops. The workshops had a set of objectives but were also kept flexible to meet the needs of the participants. Over the course of the workshop the author shared knowledge about LCP and engaged in discussion with the participants, which was in-line with the objective of the workshops as Cycle Three aimed to enable the transition towards the effective implementation of LCP. To facilitate this process, the author checked the participants' knowledge, before, during and after the workshop to identify if change had occurred.

To analyse their extant knowledge, participants were asked to place themselves into one of four categories which represented their knowledge of LCP by standing in four allocated parts of the room. The categories are listed in Table 5.7 and are labelled as 'Level of knowledge'.

Table 5.7. Pre- and immediately post-workshop knowledge check

Category	***Level of knowledge***	***Participant's self-assessment of understanding***	
		Pre-workshops	***Post- workshops***
1	No/little knowledge		
2	Some knowledge		
3	Good solid understanding		
4	Expert in the field		
	Total participants		

Table 5.7 was then populated with the information collected both prior to and after the workshops. An additional task for checking knowledge levels during the workshops involved asking participants to write a word or phrase that they associated with carbon dioxide on Post-IT notes and place it on the wall. The knowledge check exercise provided a mechanism to gather data and helped to tailor the workshop sessions through changes in language to accommodate the participants' knowledge level.

Participants were also asked to answer on a piece of card, *'What would you like to get out of today?'* The aim was to obtain information that could be used to tailor the workshop to the

needs of the participants. Feedback cards were also provided to participants to complete at the end of the workshop. This was optional and was used as a tool to gain feedback and establish impact (if any) of the workshops. The workshops consisted of four activities listed in Table 5.8. The full activities are listed in Appendix I.

Table 5.8.Workshop activities

Activity	Description
Activity One Understanding the whole life-cycle of your product and service	Activity one was split into two parts. This was used as a process to get people to engage and visualise the procurement activity, which is in line with policy that attempts to consider a product or service from a *'whole life'* perspective. This activity fitted in with the AR approach of storytelling and sharing (McNiff 2013). As part of the activity flipchart paper was used, and everyone fed back to the group.
Activity Two Stakeholder mapping and understanding impacts	The focus was to explore the various stakeholders involved in the procurement process.
Activity Three Hotspots	Activity three covered carbon hotspots. Prior to the task an explanation of hotspots was provided. This task was also used to identify participant's knowledge level. The task was used to stimulate thinking and discussion. A discussion took place about hotspots and how to identify hotspots. This included publicly available research and reports, organisations available to support them, and an awareness of how their own day-to-day activities can contribute towards change and transition to effective implementation of LCP.
Activity Four Zoning into hotspots and developing change	Given that the focus of the workshops was to enable the transition to effective implementation of LCP, the author asked the participants to complete the final task focused on change (impact). This task was used to get people to put knowledge into practice. The research brought the participants together to develop a discussion around transition, change to empower them.

At the end of the workshops, participants were also asked to repeat the knowledge check detailed in Table 5.8. The author adopted a flexible approach, a feature of AR (Reason and Bradbury 2008) to this exercise to make the audience feel engaged and empowered. This meant participants were allowed to allocate themselves on half way points between categories .e.g. 2.5 and 3.5, where requested. Participants were also asked to write down the answer to the following question and place it on the wall:

How would you explain LCP to someone?

The purpose of this exercise was to gain insight into how the participants digested the material from the workshop.

Twelve months after the workshop, follow-up emails were sent to the participants to ascertain the impact of the workshops. Participants were asked to answer two impact-based questions:

1. What changes have you made in your role to reduce carbon within your procurement activity?
2. What impact has this made?

5.3.2 Recruitment of participants

A total of twenty-two organisations were involved across the three cycles. A list of these organisations is provided in Appendix J. The recruitment process varied between cycles.

Cycle One

Recruitment for Cycle One involved the CCCW promoting the research across the public private and third sectors through emails, meetings and events. This was used to raise initial awareness. The author then followed up on this process by contacting potential participants through an introductory email that asked if they would be willing to take part in the research. Twelve interviews, four from each sector, were completed. The results from this cycle directly informed the direction of Cycle Two.

Cycle Two

Considering the findings from Cycle One, Cycle Two focused specifically on the public sector. Access to governmental bodies and senior level managers had already been secured via Cycle One, which represented an opportunity for further research in this sector. The CCCW endorsed the research by sending emails to members about the research and made the initial introductions. A list of potential organisations was drawn up by the author and subsequently reviewed by a Welsh public sector procurement policy specialist with over 30-years of experience to make sure that all the key organisations were listed. These organisations were then approached to take part in the study. Though it would be difficult to get exact number of participants in each sample group, focus was to get a minimum of fifteen in each group. Potential participants were invited via an introductory email. During the interviews the participants were asked if they would be willing to recommend further participants for the study. This process is referred to as snowball sampling, which is a non-probability sampling technique that is used to identify potential participants for studies (Thomas 2004). Snowball sampling is expedient as it helps to quickly attract additional participants; however, this strategy can also lead to potential bias as individuals who are

interested in the topic are likely to participate (Walliman 2006). Due to the constraints and pressures within the public sector, the author accepted participants obtained via snowballing to ensure that the participant pool was sufficient.

Cycle Three

These participants were recruited from NHS Wales, including individuals from the NHS Central Category Management team (i.e. high-spend areas) and local-based teams involved in procurement. An illustration of their buying power is reflected in the fact that the Category Management (non-medical) team spend over £220 million+ per annum. Participants were selected via a discussion with the Vice President of the Sustainability Group and Chair of the internal Sustainability Group. It is acknowledged that the participants for the workshops were selected by three individuals, however, they were deemed to be suitable and integral for achieving the intended outcome.

Participants

The participants in Cycles One, Two and Three will now be presented.

Cycle One

Cycle One consisted of twelve participants from the three sectors. They are listed in Table 5.9.

Table 5.9. Cycle One participants

Nº	Private	Public	Third
1	Senior Officer A (SME trade body)	Programme Manager (LA consortium buyer)	Procurement and Grants Manager (Voluntary Council)
2	Energy Development Manager (Large chemical company)	Procurement Manager C (Higher Education 1)	Project Manager (Support Agency 2)
3	Tendering Manager (SME support organisation)	Procurement Head A (NHS Wales)	Chair of the Sustainability Committee (Support Agency 4)
4	Senior Officer B (Construction support organisation)	Procurement Officer B (Local Authority 3)	Contracts and Procurement Manager (Support Agency 4)

Cycle Two

Cycle Two focused specifically on the public sector. There were two sample groups, as outlined in Table 5.10. In total, there were thirty-four participants, nineteen from Group A (GA) and fifteen from Group B (GB).

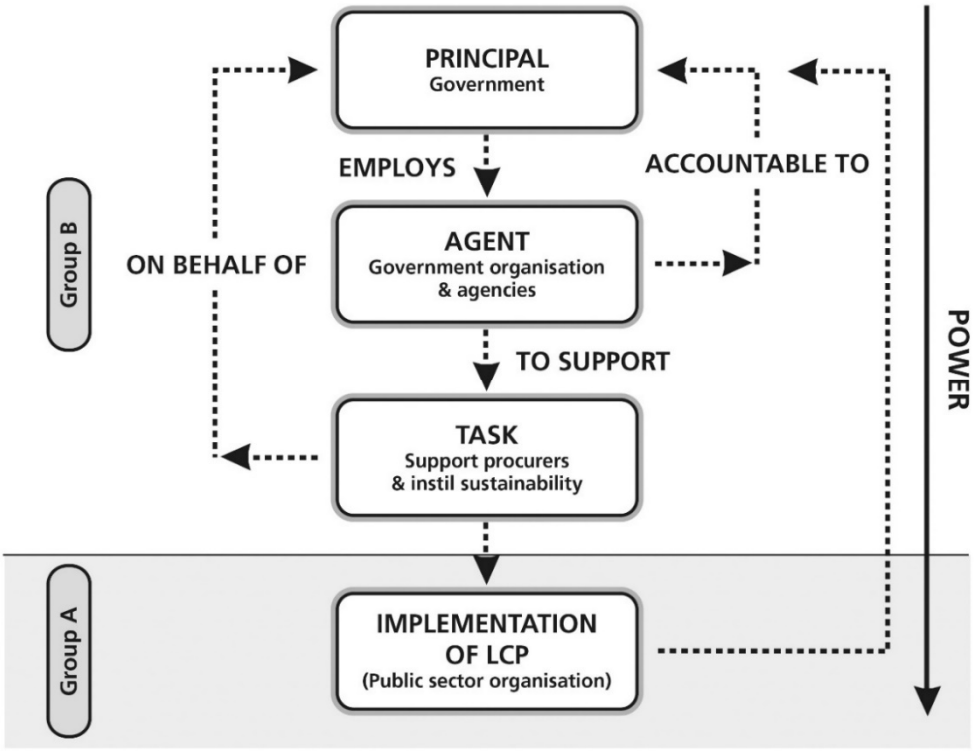
Table 5.10. Cycle Two participants

Group	Organisation group	Sub-group	Job Title
Group B	Welsh Government		Policymaker A
			Policymaker B
			Policy Implementation Executive
	Central Policy Team (CPT)		Policy Official A
			Policy Official B
	Commission		Senior Official
	Support Organisations	Support Organisation 2	Project Manager
			Markets Manager
			Research Analyst
			Senior Executive B
		Support Organisation 1	Senior Executive A
			Consultant A
		Support Organisation 3	Senior Executive C
			Sustainability Consultant
			Consultant B
Group A	National Procurement		Category Executive
	Local Authority		Programme Manager
		Local Authority 3	Procurement Officer B
			Procurement Officer C
		Local Authority 2	Procurement Development Manager
			Procurement Officer A
		Local Authority 1	Procurement Service Manager
			Procurement Manager A
	Higher Education	Higher Education 2	Procurement Manager C
			Procurement Manager D
		Higher Education 1	Procurement Manager B
	Heritage Wales		Procurement Officer C
			Procurement Specialist
	NHS Wales		Procurement Head A
			Category Manager A
			Food Procurement Specialist
			Procurement Head B
			Category Manager B
			Category Manager C

Although the participants' titles have been anonymised, they have, however, been given a job title for this study similar to their role e.g. *'Policy Official A'* to distinguish job role, seniority and position. This process was used to provide a richness to the narrative. Figure

5.5 illustrates how the two groups operate in the public sector, whilst Table 5.11 provides a description of each group.

Figure 5.5. Cycle Two – sample groups



Source: Author

Table 5.11. Cycle Two sample groups

Group	Description
Group A (GA)	Representatives from 'Procuring organisations' in the public sector, including Higher Education, Local Authorities, NHS Wales, Heritage Wales, National Procurement Service.
Group B (GB)	Representatives from 'Influencing/supporting organisations' in the public sector, including Central Policy Team (CPT), sustainability support organisations (e.g. Carbon Trust), and Welsh Government

Although there was some consideration given to incorporating suppliers into the study, they have already been sufficiently explored in extant SPP literature (see Bala et al. 2008; Igarashi et al. 2015; Hall, et al. 2016; Offei 2016; and Rizzi et al. 2014). Given the lacuna in the literature with respect to procurers (GA) and organisations that support them (GB), this

research decided to exclude suppliers and focus instead on procurers and those that support them. Moreover, there is scarce attention paid to policy teams or policymakers in extant literature, which presented an opportunity to engage with them to better understand the implementation of LCP.

Cycle Three

Cycle Three participants consisted of eighteen individuals from NHS Wales. A summary of the participants is provided in Table 5.12.

Table 5.12. Cycle Three participants

Dates	Job Title	Length of Service in NHS	Length of Service in current role
7th Sept & 4th Nov 2016	Procurement Head B	10 years	18 months
	Assistant Procurement Officer	17 years	2 years
	Estate Energy Manager	13 years	7 years
	Quality Manager	12 years	12 years
	Category Manager A	1 year	1 year
	Category Officer A	4.5 years	2.5 years
	Contract Assistant	15 years	13 years
	Category Manager B	4 years	1 month
	Category Officer B	2 years	1.25 years
	Category Manager C	4 years	2 years
	Food Procurement Specialist	3 years	3 years
22nd & 23rd Nov 2016	Operational Services Admin Support	2 years	9 months
	Catering Services Manager	20 years	10 years
	Food Support Officer (Community)	15 years	3 years
	Environmental and Sustainability Officer	3 weeks	3 weeks
	Category Officer C	20 years	10 years
	Category Officer D	4 years	4 years
	Procurement Assistant	5 months	5 months

5.3.3 Data analysis

Coding strategies were employed during the research. *'Coding'* is a heuristic term which originates from the Greek *'to discover'* (Saldana 2015). Within the context of this research, coding designates the process of going through the data, identifying key themes, and providing numerous codes for these themes which are subsequently analysed. Coding is thus a *"transitional process"* from the collection of data to more extensive data analysis (Sandana 2009, p. 4), which enables the researcher to understand and present the findings in a

structured manner. When coding is carried out properly the richness of the data can be extrapolated, understood and easily translated. The method of assigning a word or phrase was the adopted method of coding used within this research.

Approach

Manual coding was adopted as it enabled the author to stay close to the data, feel it, take ownership of it, and make it malleable. Once a manual method of coding had been chosen, the next consideration was what should be coded. In this research, key sources were coded, including the research diary (reflective notes on events, meetings, secondary data, observations), interview notes and transcripts, as well as workshop notes. The data was managed and analysed using excel files. Participant data (i.e. name, personal details) was held on a separate file to ensure anonymity.

Code Book and Rules

Initially, a *'pre-set'* starter code list (also referred to as *'a priori codes'*) was used using the list formulated from the SLR and Institutional Theory. Subsequent to coding, new codes were added to the code book. Using a pragmatic and adaptable method allowed the author to reflect upon the different stages of research and remain flexible and honest to the process of data collection. Codes can quickly accumulate; hence, in accordance with the principles outlined by MacQueen et al. (2008, p. 121), the researcher created a code book in excel. Through recourse to the work of Maykut and Morehouse (1994), this code book served as a reference point which contained the list of codes with descriptions and examples. An extract of the code book can be found in Table 5.13.

Table 5.13. Code book extract

Code	Full Title	Description/rule	Example
COS	Cost	Actual cost of low carbon products is too high compared to products without low carbon features.	*"Products with a low carbon feature simply cost too much to what we usually get"*

Process

Although there was an eagerness to code, the author took a step back and elected to preview the data. The interview transcripts were first read from beginning to end without any coding. The transcripts were then read a second time, using the three techniques of pre-coding, preliminary jotting and jotting in the margins (see Sandana 2009). This afforded the author

the opportunity to reflect on the transcripts and narrative as a whole. The quality of the coding of the first ten transcripts differed significantly from that of the last ten transcripts. This was because, initially, the author struggled with lumping and splitting the data into codes. It is for this reason that the first ten transcripts were recoded. Over time and with more experience a more refined approach was developed, as the author read line-by-line to identify codes. As this process evolved, emergent codes were added to the code book. The management of the coding book also involved an ongoing process of refining, merging and collapsing codes. A general rule of thumb for coding is to make the codes fit the data, rather than trying to make the data fit your codes, which meant that at times codes had to be refined. As part of this process, some codes naturally merged (see Figure 5.6), whilst other codes were collapsed into larger themes with sub-codes to show the degree of differentiation within the code (see Figure 5.7).

Figure 5.6. Example of merged codes

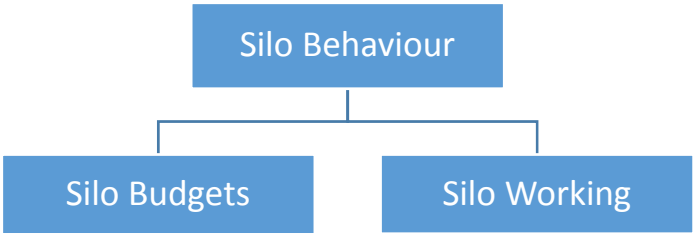
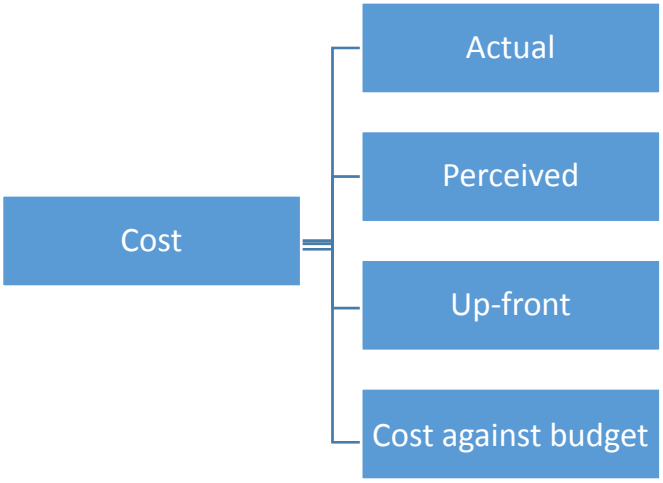


Figure 5.7. Example of larger theme and sub-codes



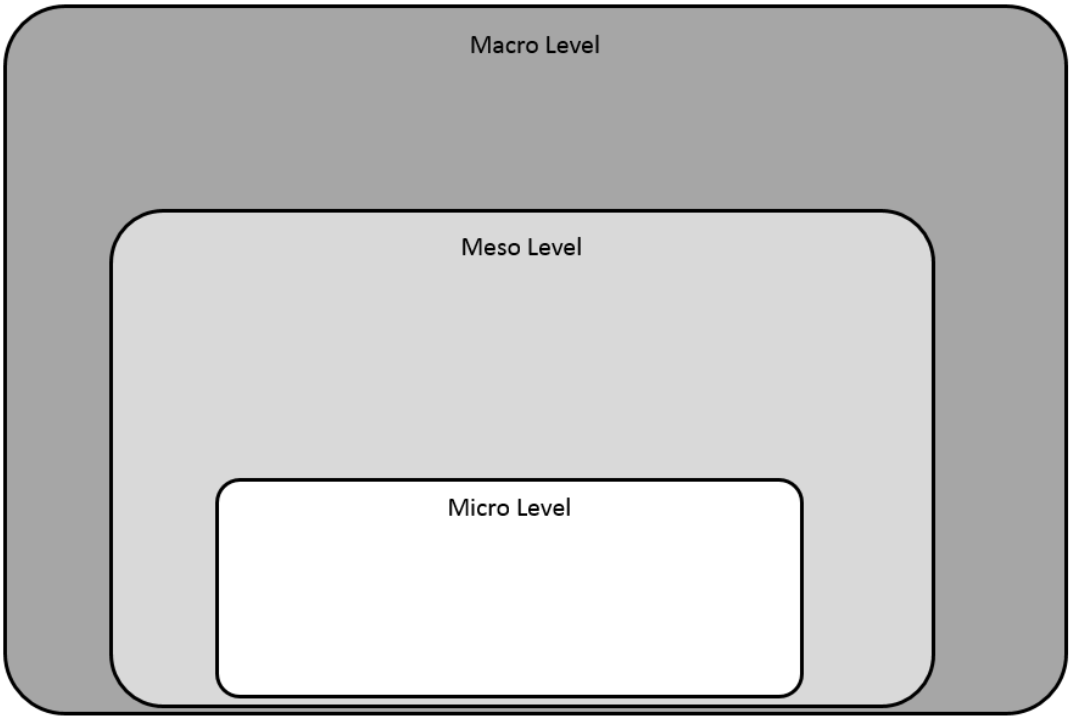
Interpreting the data

In accordance with Sandana (2009, p. 18), fieldnotes were reviewed to gain a deeper understanding. Asking these questions about the data (e.g. what does this mean? How is this connected?) enabled the author to get a better understanding of what was actually going on, which helped to tease out the key points. In addition to this, adopting Hatch's (2002, p. 155) approach, the author identified correlations, differences, frequency, sequence, correspondence and causation**.** The codes were then used to identify concepts and themes. Richards and Morse (2007, p. 157) clarify that *"Concepts are how we get up to more general, higher-level, and more abstract constructs"*.

Operating levels: identifying Macro, Meso, Micro

Rules were allocated for each level. Through analysis and interpretation, concepts and themes were placed on one of three levels (Macro, Meso and Micro), by virtue of how they operated, Macro (societal perspective, e.g. regulation), Meso (organisational and group perspective) and Micro (i.e. individual interest). The findings were then merged into an integrated model, with detailed scenarios outlined. Presenting multi-level findings in a diagrammatic form lends more depth to the research, as well as providing a visual portrayal of the sectors. The three levels are illustrated in Figure 5.8.

Figure 5.8. Macro, Meso and Micro levels



5.3.4 The researcher

This sub-section is split into three parts that address different aspects of being a researcher, including whether one is an *'embedded researcher'* or *'knowledge broker'* (Pawlowski and Robey 2004), issues around conducting second-person research (Reason and Bradbury 2008), and the role that reflection plays in research (Lepori and Riel 2014).

Embedded researcher or knowledge broker

In the initial stages, the author weighed-up the practicalities of operating as an *'embedded researcher'*. Vindrola-Padros et al. (2016, p. 1) argue that embedded researchers are embedded in an organisation and not an academic institution, however it is more common for both to be present (McGinity and Salokanga 2014). For an embedded researcher, becoming part of the host organisation is essential (Lewis and Russell 2011). According to Marshall et al. (2014) and McGinity and Salokanga (2014), becoming immersed in an organisation provides insight into the pressures and problems that people face in their day-to-day practice. Another important aspect of being an embedded researcher is developing quality relationships with staff which allows the researcher to gain trust and be seen as a member of the team (Reiter-Theil 2004, Wongs 2009, Marshall 2014). As Cycle One was conducted in collaboration with Cardiff University's Business School and the CCCW, this did not present an opportunity to embed within the research setting. During Cycle One, the author was neither aligned with nor immersed in any organisation. Cycle Two was specifically focused on the public sector, over multiple organisations, and, as such, embedded research was once again unsuitable. The author consciously sought to exude a level of neutrality in the research, and thus an embedded strategy was not suitable. The author therefore chose to conduct the research with the CCCW at their public-sector organisations operating as a knowledge broker (Brown and Duguid 1998), between the groups to broker and to work with them to achieve a common goal. This involved crossing organisational borders to gather and disseminate information and knowledge, as outlined by Brown and Duguid (1998) and Pawlowski and Robey (2004).

First-, second- and third-person

Reason and Bradbury (2006; 2008) and Reason and Torbert (2001) posit that it is expedient to see three broad pathways to conducting AR: first-person, second-person and third-person accounts. Reason and Bradbury (2006) use *'I'*, *'We'* and *'They'* to explain the three distinct levels of inquiry. First-person accounts are when an individual *(I)* reflects on their own practices and provides an account. This is centred on the *'researcher'* reflecting upon

themselves and their practice. Second-person accounts refer to when people inquire with others about how they address issues of mutual concern. Second-person inquiries *(We)* focus on the community, social and/or organisational level. Second-person inquiry is the approach adopted in this research. Third-person AR involves connecting individual researchers with a wider community (Riel and Lepori 2014). Third-person inquiry was not appropriate for the author's purposes because it operates at a Macro-Level, such as institutional change or movements (see also Chandler and Torbert 2003; Gustavsen 2003; Gustavsen, Hansson, and Qvale 2008; Reason and Bradbury 2006; and Wicks and Reason 2009). Table 5.14 illustrates how although this study is a second-person inquiry, it is nevertheless still influenced by first- and third-person modes of inquiry.

Table 5.14. Research Inquiry level

First-person inquiry	Second-person inquiry	Third-person inquiry
Reflective practice Personal reflective practice *Examples:* *Research diary* *Observation notes* *Personal and professional growth*	Involves community, social and/or organisational level *Examples:* *Meetings* *Interviews* *Shared learning events* *NHS workshops* *Research cycles* *Event interaction*	Operates at a Macro-level to institutionalise change or develop a social movement *Example:* *IPSERA conference paper* *CCCW Report* *SME funding release* *Change in public policy*

These distinct levels become intertwined at points. For example, the second-person mode of inquiry adopted in this research was both influenced by first-person inquiry and influenced third-person modes of inquiry, which is illustrated in the direction of the impact arrows below Table 5.14.

Reflection

Key to AR is the idea that understanding is grounded in experience and that one should adopt an analytic approach to evidence (Lepori and Riel 2014), followed by reflective integration (Reason and Bradbury 2006). This means that deep reflection is integral to the research process, as it helps to generate new avenues for exploration (Lepori and Riel 2014, p. 54). Riel and Lepori (2014, p. 71) note that action researchers use reflective writing to help them

focus on themselves and their role at the centre of research. The author documented reflections in a personal diary, comprised of notes, observations, personal reflections, events, and reflections on change some of which are presented within this Thesis. Criticos (1993) and Merriam (2004) recognise that the experiences that one has when conducting AR can be powerful, but that effective indications of transformational learning generally do not take place without sustained periods of reflection. McIntosh (2010) dedicated a whole chapter on reflection, AR and reflexivity, which emphasises the importance of reflection in an AR context. Reflection was an ongoing process in the research, especially towards the end of a cycle, that helped to provide direction and justification for the next cycle of inquiry. Without this reflection, there would not have been three cycles in this research.

5.3.5 Practical dimensions

As part of the study, there are several practicalities that needed to be considered and managed. These included '*access, collaboration and gatekeepers'*, *'perception of the researcher'*, *'interview logistics, neutral ground and building trust'* and *'research ethics'*, which are all discussed in this section.

Access, collaboration and gatekeepers

The author was aware that access would be an on-going concern that would require negotiating. Although Cycle One was a collaborative endeavour, neither access nor collaboration were guaranteed. Rather, the issue of access was constantly (re)negotiated throughout the cycles. The CCCW maintained the position as gatekeeper throughout the study, opening the gate at points, whilst at other times, possibly due to changes in their organisation, unintentionally closing the gate. As a result, access was an on-going concern for the author and not always guaranteed. In those instances, in which the CCCW was able to provide access, it was more often in the form of an introduction to an organisation, which allowed the author to approach organisations with the CCCW's endorsement. However, this initial access did not guarantee future involvement and thus steps were taken to engage, discuss, seek consent and undertake all the necessary steps before participation could be arranged. It is important to note here that without the involvement of the CCCW, the level and depth of research conducted within this research would not have been possible.

Perception of the researcher

The author was aware that the participants may perceive them as either working for or in collaboration with the CCCW, given their involvement in Cycle One. To mitigate this

perception, the author projected an affiliation with Cardiff University in an attempt to create an independent identity. The purpose here was to elicit unbiased responses from the participants. As part of this strategy in projecting neutrality, the author used *'Cardiff University Business School'* business cards and approached using a Cardiff University email address. Coming from a background in the private sector, the author identified early on that individuals within the public sector often knew each other and maintained friendly, informal relationships. Adopting this more informal approach worked particularly well in gaining access and building rapport with the participants in the public sector across the three cycles. Whilst maintaining professionalism, the author found that after initial introductions, speaking in a more informal manner elicited more honest responses, which, in turn, enabled the snow-ball process of recruitment. Another turning point in the research was when the author won the *'Young Professional of the Year 2016'* award at the Welsh National Procurement Awards for contributions to the sector. This award is widely recognised within the Welsh procurement sector and this publicity led to a number of invitations to collaborate with organisations on carbon related matters. Overtime, the perception of the author changed within the sector. This acceptance within the sector directly led to the collaboration with the NHS in Cycle Three of the research.

Interview logistics, neutral ground and building trust

Interview participants were invited to take part in interviews either at their own workplace, Cardiff University Business School (Aberconway Building) or an alternative venue of their choice. Being flexible with participants helped to overcome issues pertaining to access and availability (Arkset and Knight 1999; Warren 2002). At times, this meant revisiting an organisation on multiple occasions to interview employees due to scheduling demands. However, the author, if possible, conducted interviews with multiple employees in an organisation, on the same day (i.e. individual interviews). The author would build rapport and trust leading up to an interview. Participants were given a choice of being tape-recorded, and four participants refused to be recorded.

Research Ethics

Ethical approval was obtained from Cardiff University for all stages of the research. Please see Appendix K for Ethics Forms. Data was securely managed on a password protected computer.

5.3.6 Aspects of quality

This research approached the issue of research rigour by applying Lincoln and Guba's (1985) framework of trustworthiness, which is comprised of four components: credibility (truth); transferability (applicability); dependability (consistency); and conformability (neutrality). Allied with this, AR's quality criteria centres around the notion of *'usefulness'* (Koplin 2005), which recognises and foregrounds the action and problem-solving dimensions, such as communication, intervention, transparency, and relevance. A range of research strategies were adopted to enhance the credibility of the research drawing upon Creswell and Miller (2010), Guba and Lincoln (1989), Morse (2015), Noble and Smith (2014) and Pandey and Patnaik (2014). Accordingly, the author has prepared a table outlining Lincoln and Guba's (1985) and Koplin, (2005) quality components and its practical application to this research in Table 5.15.

Table 5.15. Aspects of Quality (Adopted from Lincoln and Guba 1985; Koplin 2005)

Quality	Strategy	Application in research
Credibility – confidence in the truth of the findings.	Reflexivity and reflection on own perspectives	Reflective research diary used to document decisions made and the author's thought process. Researcher disclosed philosophical assumptions in this chapter.
	Persistent observation	Regular diary entries were made in the field to provide depth.
	Prolonged engagement	The author was in the field for 30 months gathering data and engaging with the sector at events (i.e. shared learning event 2016).
	Semi-structured interviews and recording	All interviews (except four) were recorded and allow for the opportunity to revisit and check the data.
	Rich and verbatim extracts	Rich and verbatim extracts from the interviews are used to outline the findings.
	Interview transcript checks	Interviewees were provided with transcripts of the interview to confirm accuracy.
	Triangulation	Multiple data sources were used: interviews, workshops, secondary document analysis, and diary entries were triangulated to ensure accuracy.
	Peer-briefing	The author presented at two conferences and obtained feedback. The author also obtained advice from peers, supervisors and recent PhD graduates. The author also discussed findings with a Public Sector Procurement specialist with over 30 years of experience.
	Collaboration	The author collaborated with the CCCW, Value Wales, NHS Wales and other organisations through interviews, workshops and attending meetings. Collaboration also provided the opportunity to share findings and obtain feedback.
Transferability – show the findings are applicable in another context.	Contextual information provided (Thick description)	Contextual information provided (i.e. context chapter) to enable transferability of the findings.

	Researcher's experience	Detail of the author's experiences are presented throughout the thesis and contained in the research journal.
	Sampling	Sampling techniques discussed in detail in this chapter
Dependability – show findings are consistent and could be repeated.	Inquiry audit	Details about the choice of research design and how the data was collected, coded and analysed are presented in this chapter. Findings are outlined in the next chapter.
	Cycles	Decisions made during cycles and changes are outlined in the research and within the research diary.
	Coding	Coding strategy is outlined in this chapter.
Confirmability (Neutrality) – a degree of neutrality or the extent to which findings of a study are shaped by the respondents, rather than a researcher's own bias, motivation or interest.	Audit trail	The research diary (contemporaneous notes, thoughts and reflections) kept a record of what was observed in the field. It outlined the steps that the author took and why this occurred. Raw data is saved in a secured password protected computer. Data reduction and summary of analysis are stored in the code book. The merging and splitting of codes are outlined in this chapter. Data reconstruction and synthesis reports – structure of categories is outlined in findings and conclusion. The process is outlined in this chapter, including procedures, designs, strategy and rationale.
	Practice reflexivity	Research recording decisions, thoughts, observations and changes are documented in the research diary.
	Negative cases	Examples which do not support the outcomes are included in the findings chapter.
Usefulness - recognises the action/change and problem-solving dimensions	Communication	Communicated with multiple participants to identify drivers, enablers and barriers, which helped to identify the strategies that can be implemented to achieve LCP.
	Intervention	The barriers identified in Cycle Two presented an opportunity to facilitate change via Cycle Three.
	Transparency	Recorded reflections, decisions made in the research diary. Coding process outlined.
	Relevance	Relevance to the practical problem in Wales, and the need for research and action required at different stages of the research.

5.4 Summary and Conclusion

Chapter Five outlined the research methodology and research design that was mobilised in the research. The chapter provided a rationale for why the author adopted a pragmatic philosophy and abductive approach, before proceeding to elucidate how AR provides a flexible action-oriented approach and why it is potentially expedient for the study of LCP. As part of the discussion on research design, the modes of data collection and methods were outlined, along with a discussion of the recruitment strategies, mode of data analysis, practical issues and, finally, strategies for maintaining rigour that were applied in each of the respective cycles of inquiry. The elected methodology took into consideration extant literature identified in the SLR, as well as complementing the contextual research setting and the parameters of a PhD study. The most important point to take away from this chapter is that this study is not a traditional linear piece of research, due to the research being conducted across three distinct AR cycles of inquiry and the fact that the research setting underwent significant transition during the time of the PhD (i.e. austerity, change in legislation). Overall, this chapter presented the research methodology for this research, which evolved organically over the course of three emergent AR research cycles and detailed the direct contributions from distinct participant groups and multiple sources of data collections to provide a unique rich insight. Keeping to the spirit of AR, the following two chapters present the research 'findings and discussion' from Cycles Two and Cycle Three, respectively.

6 Cycle Two Findings and Discussion

6.1 Introduction

The aim of this chapter is to present research findings from Cycle Two, which is focused on answering research questions two and three:

RQ2: What are the major drivers of LCP within the public sector, and how do they operate?

RQ3: What are the major barriers and enablers of LCP within the public sector, and how do they operate and interact?

This chapter follows a systematic format to present, in turn, the major drivers, enablers and barriers emerging out of the research split over three levels of analysis: Macro, Meso and Micro. Through recourse to Institutional Theory (IT) as a primary lens, the findings, where applicable, are categorised into the three pillars of IT (Regulatory, Normative and Cognitive). A discussion of the findings will take place through the chapter. At the end of each section a conceptualised multi-level model will be presented illustrating the key themes and concepts found in the dataset, followed by a table summarising the findings with additional participant commentary. Following a presentation of the findings the research questions will be answered. The three models (i.e. drivers, enablers and barriers models) will be then integrated into one model with detailed scenarios and propositions for researchers, policymakers and procurement professionals to understand, promote and facilitate the implementation of LCP. The chapter will then close with a summary of the chapter and direction for Cycle Three. Cycle Two is comprised of two sample groups:

Table 6.1. Sample groups

Group	Description
Group A (GA)	Representatives from 'Procuring organisations' in the public sector, including Higher Education, Local Authorities, NHS Wales, Heritage Wales, National Procurement Service.
Group B (GB)	Representatives from 'Influencing/supporting organisations' in the public sector, including Central Policy Team (CPT), sustainability support organisations (e.g. Carbon Trust), and Welsh Government

Within the chapter, references will be made, where necessary, to identify the group that the participant represents. At this juncture, it is important to note that some of the themes and

concepts identified within the findings may exhibit similarities or overlap with others, whilst others may appear at different levels (Macro, Meso and Micro). Consequently, what may appear like repetition of individual themes and concepts is, in fact, intentional and an accurate representation of the findings.

6.2 Macro Drivers

The research findings identified that the principal Macro level drivers of LCP are formal and informal institutional pressures (i.e. regulatory, normative and cognitive pressures). A summary of each is presented in turn.

6.2.1 Regulatory

The data indicates that regulation was a key driver of LCP at the Macro level. Participants provided accounts of legislation; treaty, principle, programmes and strategies used in the area. Additionally, regulatory pressure through upcoming leadership was mentioned.

Legislation

The legislative framework for LCP from the data appears to be strong. Interviews with both groups outlined that legislation plays an integral role in driving LCP within the public sector, a finding endorsed by a Sustainability Consultant (Support Organisation 3).

> *"LCP is largely driven by legislation. So, there is a lot of sophistication in reducing carbon, because it was driven by legislation. It's not a kind of optional add on anymore."*
>
> *Sustainability Consultant*
>
> *Support Organisation 3 (GB)*

This extract emphasises the obligatory requirement to incorporate LCP through strong regulatory pressure. This is in accordance with Dawson and Probert (2007), Thomson and Jackson (2007) and Zhu et al (2013) who identified legislation as a key driver for LCP. Although the Sustainability Consultant (GB) did not cite any specific legislation, the research findings identified four pieces of legislation that were repeatedly referred to as drivers of LCP. These pieces of legislation are presented in Table 6.2.

Table 6.2. Legislation

Name	Objective	GA	GB
EU Energy and Efficiency Directive	*"Energy Efficiency Directive establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020."*[10]		X
Climate Change Act 2008	*"The Act makes it the duty of the Secretary of State to ensure that the net UK carbon account for all six Kyoto greenhouse gases for the year 2050 is at least 80% lower than the 1990 baseline."*[11]		X
Environmental (Wales) Act 2016	*"The Environment (Wales) Act puts in place the legislation needed to plan and manage Wales' natural resources in a more proactive, sustainable and joined-up way."*[12]	X	X
Well-being of Future Generations Act (Wales) 2015 (FGA)	*"The Well-being of Future Generations (Wales) Act is about improving the social, economic, environmental and cultural well-being of Wales."*[13]	X	X

Table 6.2 outlines that GA participants identified recent Welsh legislation as a key driver of LCP. Overall, the findings confirm that GA participants were less familiar with wider legislation, whilst their GB counterparts referred to local, regional, national and international legislation as key drivers. GB participants thus appeared to have a greater understanding of overarching legislation, which is to be expected given that the GB participants comprised of government policymakers, policy officials and staff working for support organisations established by the government to facilitate the delivery of sustainability policies. Policymaker A notes:

> *"There is a hierarchy in this sort of thing…local, regional, national, EU and international legislation."*
>
> *Policymaker A*
>
> *Welsh Government (GB)*

The notion of 'hierarchy' is used here to distinguish between the different layers of legislation driving LCP. This finding contributes to extant literature by stressing the importance of understanding how layers of legislation function as a driver, as opposed to just viewing 'legislation' in and of itself as a driver. A hierarchy of legislation, a

[10] https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive
[11] https://www.legislation.gov.uk/ukpga/2008/27/contents
[12] http://gov.wales/topics/environmentcountryside/consmanagement/natural-resources-management/environment-act/?lang=en
[13] http://thewaleswewant.co.uk/sites/default/files/Guide%20to%20the%20WFGAct.pdf

comprehensive framework suggests strong regulatory pressure for LCP, which, in turn, builds coercive isomorphism (Scott 2014). GA participants were evidently familiar with regional legislation, but whilst they appeared to accept that regional legislation worked in conjunction with national and international legislation, they lacked a deeper understanding of the specificity of this relationship. In contrast, findings from GB participants demonstrated a greater understanding of legislation, including that parts of recent Welsh legislation override existing UK legislation, a fact that most GA participants were unfamiliar with. This is important because it outlines a recognisable knowledge gap between the two groups. The concept of knowledge as a resource is integral to this point and is explored later in this chapter. The findings from both groups highlight that *'sustainability'* legislation is a key driver of LCP. Policymaker A elaborates recent Welsh legislation is a driver of LCP.

> *"From the Environment Act and the Well-being of Future Generations Act, it's quite clear that you will need to have thought about low carbon and sustainability when we are procuring because carbon goals fitted into the Act. There is accountability."*
>
> *Policymaker A*
>
> *Welsh Government (GB)*

Participants from both groups reference regional legislation, with an especial emphasis on *'sustainability'* legislation, which supports the notion that sustainability legislation is driving LCP. Conversely, procurement directives, which are integral to all procurers, were not recognised as a driver by either group. This supports the findings of Correia et al. (2013), who stressed the importance of sustainability-oriented legislation, specifically the Climate Change Act (2008), as being a key driver. This finding suggests that sustainability legislation is a greater driver than procurement legislation, which adds an additional layer of complexity to extant literature in this area insofar little comparative discussion exists over the various pieces of legislation driving the LCP agenda.

Treaty, principle, programmes and strategies

GB participants, more so than their GA counterparts, cited the various treaties, principles, programmes and strategies produced to support legislation as key drivers of LCP. The following treaty, principle, programmes and strategies reported in the interviews are displayed in Table 6.3.

Table 6.3. Treaty, Principle, Programmes and Strategies

Name	Type	Objective	GA	GB
Kyoto protocol	Treaty	*"The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets."*[14]	X	X
Green Growth Wales	Principle	*"The sustainable development principle, as set out in the Well-being of Future Generations (Wales) Act, is the basis upon which our green growth agenda is being developed."*[15]		X
Climate Change Strategy for Wales 2010	Strategy	*"Sets the focus of Welsh Government action to accelerate climate change action in the public sector."*[16] Supporting behaviour change across the public sector to reduce carbon emissions.		X
Energy Efficiency Strategy Wales	Strategy	*"The strategy considers our role in driving this agenda, as well as the role of other organisations, businesses and householders."*[17]		X
Total Zero Waste	Strategy	*"Overarching waste strategy document. It describes how Wales will deal with waste in Wales to produce benefits for not only the environment, but the economy and social well-being."*[18]	X	X
Decarbonisation Wales	Programme	WAG programme focused on decarbonisation of the Public sector.[19]		X
Resource Efficient Wales (REW)	Programme	A WAG programme committed to reviewing resource and energy efficiency measures and the support available to individuals, businesses and the public sector.[20] As part of this programme, external organisations have been funded specifically to support public procuring organisations with specialist technical services and support.	X	X

Three participants from GB cited the Kyoto Protocol and the REW programme. The reference to the Kyoto Protocol supports the work of Asselt (2006). As aforementioned, Kyoto is an international agreement imposing targets, which countries such as the UK, have committed to. Thus far, the argument has been put forward that strong regulatory pressure drives the implementation of LCP. This is confirmed by the fact that the REW programme is referred to as a key driver for change in LCP by participants in both groups. This explicit reference to

[14] http://unfccc.int/kyoto_protocol/items/2830.php
[15] http://gov.wales/topics/businessandeconomy/creating-a-sustainable-economy/green-growth-wales/?lang=en
[16] https://seneddresearch.blog/2017/06/21/decarbonising-the-public-sector-in-wales-what-next/
[17] http://gov.wales/topics/environmentcountryside/energy/efficiency/energy-efficiency-strategy-for-wales/?lang=en
[18] https://gov.wales/docs/desh/publications/100621wastetowardszeroen.pdf
[19] http://gov.wales/newsroom/environmentandcountryside/2017/170705-welsh-public-sector-to-be-carbon-neutral-by-2030/?lang=en
[20] https://www.slideshare.net/theCCCW/resource-efficient-wales-rew

programmes and principles identified in this research marks another small contribution to the SPP literature, as currently regulatory pressure is predominantly discussed in terms of legislation and strategies (see Nash 2009). GB participants appeared to be more familiar with the items presented Table 6.2, which, once again, exposes a knowledge gap between the groups, similar to that discussed earlier in relation to legislation. The most credible explanation for this knowledge-deficit is that the GA participants primarily operate on the Meso level, whereas the GB participants operate at the Meso and Macro levels, and, as such, are expected to possess greater knowledge.

Upcoming Leadership

The Future Generations Commissioner's Office (FGCO) is one of the most recent development in Wales, having been set up in 2016. The FGCO was viewed as building on the work of the CCCW which ceased its operations in 2016. Despite only being in its infancy, the FGCO was recognised by GB participants as an important driver of LCP, primarily due to the Commission's recently introduced legislative powers to enforce sustainable development. Indeed, participants from both Groups saw the Future Generations (FG) Commission as a stronger driver than the CCCW. Six participants from GB and four from GA recognised the implementation of the FGCO and its role as a key driver of LCP. Despite the positive response from participants in this research, there is limited evidence currently available through which to effectively measure the actual success of the FGCO as a driver. In looking towards the FGCO (and sometimes more specifically the FG Commissioner), participants were primarily emphasising the potential for the provision of leadership, something that both Chiarini and Vogoni (2016) and Grandia et al. (2015b) consider to be an important driver of SPP. Rost (1991 p. 102) describes leadership as *"an influence relationship among leaders and collaborators who intend significant changes that reflect their mutual purposes*" and the main form of leadership that appears to be expected from the Commission/Commissioner is serving as a carrier of agency, of regulatory pressure. In effect, it is the FG Commissioner's role to lead the WBFG Act.

A key role of the FG Commissioner is to facilitate the transition towards a more sustainable society for Wales, which is typically couched in terms of '*transformational change'* (see, for example, the *'Future Generations Commissioner for Wales Annual Report 2017-2018'* which is framed in terms of a '*transformational agenda for public bodies in Wales*'). The logical upshot of this expectation that the Commission/Commissioner should deliver both leadership and transformation, is that they are expected to provide *'transformational*

leadership'. This is something that the FG Commissioner strongly implied herself in remarks prior to a sustainable procurement event, when she said that "*Up until now, procurement is something that has been done in a certain way, often seen as a blocker rather than an enabler, a transactional rather than a transformational process"* and that *"Stronger leadership is needed, from within every area of our public sector, and commitment in stepping up these efforts. Procurement is so often seen as one area, in its own silo, but if we are to do this properly our approach to procurement must consider the whole system, not just one area in isolation. Now is an opportunity to ensure procurement is fit for the future".* The understanding of transformational leadership used in this thesis comes from Bass and Riggio (2006 pp. 6-7) who state: *"Transformational leadership consists of four sub-dimensions: (1) idealised influence, in which the leaders are admired, respected, and trusted; (2) inspirational motivation, which reflects how leaders motivate and inspire employees by providing meaning and challenge in their work; (3) intellectual stimulation, which refers to stimulating employees' efforts to be innovative and creative by questioning assumptions, reframing problems, and approaching old situations in new ways; and (4) individualised consideration, which involves leaders paying more attention to each individual follower's needs for achievement and growth by acting as a coach or mentor."* Transformational leaders are known to be able to communicate a vision and bring employees together to achieve their goal of change (Grandia et al. 2015b p. 248). As a result, transformational leadership is often found to positively influence people's commitment to change (Herold et al. 2008; Michaelis, Stegmaier, and Sonntag 2010). Good leadership in the context of LCP would therefore seem to need to come from some form of transformational leadership, however this issue has hitherto only been given cursory attention in SPP literature. Roman et al's. (2017) work is a rare exception in this regard, as this is one of the few papers that refers to this style of leadership within extant SPP literature. This finding thus makes a significant contribution to the field and outlines the benefits to be yielded from further SPP literature examining in greater detail what the potential contribution and nature of '*transformational leadership'* might be in SPP and LCP. Broadly speaking, sustainability is underpinned by the notion that the current state of affairs is not sustainable, and that change is required to move towards more sustainable societies. Hence, *'transformational leadership'* could become a crucial concept in the field moving forward.

A picture slowly emerges here of formal institutions being governed by regulations, which connects with the wider literature (Min and Galle 2011; Zhu and Sarkis 2007). This study

reports that, although regulatory compliance is indeed a driver, there is a distinction to be made between the types of regulatory pressures, such as sustainability legislation, treaties, principles, programmes and strategies.

6.2.2 Regulative and normative

Ministerial Support

Though norm-based drivers were not strong, Ministerial support for LCP stood out in the data, as well as being a regulatory pressure. Ministerial support was also referred to as a driver by participants from both groups. In 2012, the Minister for Finance and Government Business launched the Wales Public Procurement Policy Statement (WPPS). An extract from a participant from the Local Authority 3 recognises the implementation of the WPPS.

> *"…the ministers have been pushing greatly in the area."*
>
> *Procurement Officer B*
>
> *Local Authority 3 (GB)*

One can discern from the above extract how ministerial support is understood as instilling normative expectations from society. At present authors (see Preuss 200; Rolfstam 2009; Sonnino 2009; Testa et al. 2012) identify policy as a driver but not the *'carrier'*, *'enforcer'* (Scott 2014) such as Ministerial support. This finding adds to the SPP literature, because it highlights how the institutional frame provides a lens through which to observe such normative and regulative pressure and the role of the carrier. In contrast, although Ministerial support was also considered to be a driver by GA participants, there were differences in opinion, which, yet again, indicates interesting points of divergence between the two groups. Four GA participants dismissed Ministerial support as not necessarily translating into driving the agenda. This finding suggests that there are weaknesses in the pressure, as findings suggest that Ministerial support did not always support the implementation of LCP in practice. The following extract demonstrates this frustration:

> *"This [delivering sustainability and LCP] has proved challenging to deliver when the government is focused on a whole range of activities and there are different priorities for different Ministers. If you are trying to be everything to everyone, you are undoubtedly going to achieve little…"*
>
> *Category Manager A*
>
> *NHS Wales (GB)*

The extract suggests that weaknesses appear at a Ministerial level due to the prevalence of different norms and priorities, as well as the manifold pressures that ministers must contend with. Despite such differences in opinion, ministerial support is still considered to be a key driver of LCP given the overall consensus is positive. The primary point of contention from GA participants towards ministers centred on them prioritising their efforts elsewhere, and thus taking time and resources away from LCP. There is no reference to Ministerial support within extant SPP literature; hence, the findings around regulative and normative pressure represents a contribution to the literature. Moreover, the findings also cast light on the role of *'individual agency'* (Scott 1995), as well as the role of *'power and influence'* (Mohammed 2017) played by Ministers.

6.2.3 Cognitive

Subject Review: Stern Review 2006

Lord Stern's Review (2006) into the Economics of Climate Change, which laid the foundation for subsequent legislation, was reported as a major driver of LCP by GB participants. Chapter Two provided a summary of the Stern Review and elucidated its contribution to the sustainability agenda. Interestingly, the Stern Review (2006) was only acknowledged by GB participants, once again reaffirming the knowledge gap between the respective groups. The following extract highlights the influence of the Stern Review (2006).

> *"There are risks of not doing anything, either in terms of risks to society and that's the whole adaptation agenda, so with this there's quite a lot of work done in this area by people such as Lord Stern have shown the longer you leave it, the higher the cost of adaptation faced by individual businesses, in homes, and government as a whole. So, it makes sense financially, to do it sooner rather than later as well."*
>
> *Policymaker B*
>
> *Welsh Government (GB)*

The above extract emphasises the fiscal benefits of proactive action, an idea which resonated particularly with GB participants. These findings thus demonstrate that the Stern Review (2006) remains an active driver of LCP over a decade after its publication. This is striking in light of the fact that the Stern Review (2006) is rarely discussed within the SPP literature, although Thomson and Jackson (2007) did report it as a driver shortly after its publication. Although the Stern Review (2006) is neither a law nor regulation, these findings demonstrate to how a *'Review'*, as an artefact, is itself a carrier of agency. Suchman (2003, p. 98) posits

that *"An artefact is a discrete material object, consciously produced or transformed by human activity, under the influence of physical and/or cultural environment."* In this respect, we can understand the Stern Review (2006) as carrying what Palthe (2014) refers to as *'cognitive pressure'*, in that it helped to instil a new way of thinking about and responding to climate change. This pressure is placed on societal level, Macro level, and therefore appears in this section of the discussion. Due, in part, to the Stern Review (2006), climate change came to be framed as a means through which to reduce long-term costs, rather than viewing it only in terms of short-term fixes. Stern Review is recognised as a cognitive pillar within IT given that it has changed cognitive attitudes and beliefs towards climate change.

6.3 Meso Drivers

Three Meso drivers were identified in the research: Wales Procurement Policy (WPP); Central Policy Team (CPT) and collaboration.

6.3.1 Regulatory

Policy: Welsh Procurement Policy (WPP)

WPP was referred to as a key driver of LCP by both groups. To provide context, the WPP statement adopts the Sustainable Procurement Task Force's earlier definition of procurement, outlined in Procuring the Future (2006):

> *"the process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organisation, but also to society and the economy, whilst minimising damage to the environment".*

This definition outlines the policy expectations of how an organisation's procurement processes can implement different elements of sustainability together (i.e. social, environmental and economic). This finding is in accordance with the work of Amann et al. (2013), Li and Geiser (2005) and Rimmington and Hawkins (2006) who also refer to policy as a driver. WPP policy carries regulatory pressure for procurers to instil SPP and its related areas, such as LCP. Although the participants considered it to be a driver, there were nevertheless some interesting differences in opinion. GA participants provided positive and negative responses that were not sector-specific (e.g. NHS Wales, Local Authority etc), whilst, conversely, GB participants recognised WPP as a major driver. Unlike legislation,

policy provides guidance that is regulatory but not binding, which can undermine its ability to put pressure on individuals and organisations. One reason for these divergent viewpoints between groups GA and GB may be bias, as group GB includes policymakers and policy officials who are involved in the creation and management of such policies, and thus perhaps view it as a carrier of regulatory, mandated pressure. The connection indicated between the strength of policy is evidenced in the extract below, whereby Policymaker A (Welsh Government) explains the connection between legislation and policy, and how regulatory drivers operate.

> *"What we're trying to do is use legislation to address specific issues, this driver is on a high level and then with policy get that out through a service that allows people to engage and allows people to basically be certain on the activity they were going to undertake and reduce some of the risk."*
>
> *Policymaker A*
>
> *Welsh Government (GB)*

The account highlights that legislation and policy are designed to work in harmony, whereas GA participants (those working in procurement) observed this not to be the case. The fact that legislation and policy do not always compliment and work in tandem with one another has not been noted in extant literature. This resonates with other findings centred on a lack of alignment between government policies and legislation that are addressed later in this chapter. At present, research (see Rolfstam 2009; Sonnino 2009; Testa et al. 2012) shows that policy is an important driver. This study makes the connection between policy and legislation, in terms of how they operate together and where weaknesses present themselves. There is a need to differentiate legislation from policy given legislation represents formal regulatory rules whereas policy is guidance.

6.3.2 Normative

Central Policy Team (CPT)

Participants from the CPT (GB) emphasised that they were driving the agenda forward to unify sustainability and procurement, spreading norms and expectations across procurement. From the data, they appear to carry normative agency to instil LCP and do things like they *'ought to be done'* (Palthe 2014). Policy Official A, from the CPT (GB) suggested promoting the alignment of sustainability with procurement. This led to the

creation of CPT, which was formerly the '*Sustainable Procurement Policy Team'*. There is a paucity of research examining procurement policy teams and their normative agency within the SPP literature, and thus this finding addresses this gap. The CPT were perceived by some GA participants as a driver that provides consistency, spreading norms and alignment in the ongoing endeavour to reduce carbon through procurement in Wales. This finding connects with the notion of professional norms (Grob and Benn 2014). Instilling the requisite professional norms puts normative pressure on individuals and organisations to adhere to such standards (Scott 2014). Alignment provides an indication of the movement toward homogeneity in the implementation of LCP. The following two extracts from GA participants applaud the role played by the CPT.

> *"<central policy team> are of course shaping the policy, so they've got lots of fantastic initiatives driving the agenda forward. They are spreading professional norms across the sector."*
>
> *Category Executive*
>
> *National Procurement Service (GA)*

> *"<central policy team> have a special place in my heart. I've been in the industry a long time and remember the days when we had little guidance in the area. They come as a breath of fresh air. They provide some level of guidance within procurement and in areas like low carbon and sustainability."*
>
> *Procurement Manager A*
>
> *Local Authority 1 (GA)*

This fits with the professional expectations of a procurement policy team, but this can also be looked at in other contexts, such as the expectation that lecturers and doctors adhere to a certain level of professionalism, which, in turn, reinforces professional norms (Grob and Benn 2014) and improves homogenisation. However, these positive views were not shared by all the participants. GA participants were critical towards the CPT, but nevertheless the overall consensus was that the CPT was a driving force for normative pressure for LCP, which is another indication of the importance of *'power'*, *'influence'* and *'interest'* within the institution (Mohamed 2017). From the data CPT hold all three components at a moderate level and appear to be using them to instil LCP. Concerns surrounding the CPT will be addressed in the barriers section, later in this chapter. The role of the CPT in exerting

normative pressure contributes to extant literature, as currently though the policy itself is referred to as a driver (see Rolfham 2009; Sonnino 2009), the group that manages the policy and standardisation of LCP is not covered within the literature.

Collaboration

The work of CCCW was seen to be to collaborative with procurers (GA) and CPT (GB) to facilitate change. This activity was referred to as a driver by both groups. In this thesis collaboration is understood as *"the process of two or more people or organizations working together to complete a task or achieve a goal*" (Marinez-Moyano 2006 p. 83). GA participants confirmed that they had collaborated with the CCCW and gained valuable insights into LCP and sustainability. This finding coincides with two separate journal entries made by the author during Cycle One. The diary entries record that CPT were involved in an engagement event supported by CCCW and research project involving Cardiff Business School (see Begum et al. 2016a). The author's diary notes from Cycle One confirm that participants from CPT, despite not being official members of the CCCW, still collaborated on CCCW projects. CPT participants hailed the collaboration as being fruitful, in that it enabled them to share perspectives, norms and learn from each other's experiences. Collaboration of this kind could be understood as a process where CCCW are the agents supporting LCP. Their work is connected to building a level of professionalism and normative influence to support LCP. This finding adds to the current SPP literature, which hitherto has failed to examine the influence of other agents (excluding suppliers). Current literature focuses on collaboration from the perspective of procurers and suppliers (Hall et al. 2016; Walker and Preuss 2008). The literature does not take consideration of collaboration between public sector organisation and other agents. This study makes a small contribution making the connection between collaboration with agents.

Diary: Young Professional of the Year 2016.

10th June 2016

It was only a month ago that Jane contacted me during my trip to Brazil to inform me that I had been shortlisted for the Young Professional of the Year, 2016 (Welsh National Procurement Award). At that time, I was surprised, of course, but simply thought that it would blow over and I would hear no more about it. I was shocked when I made the shortlist, as I believed this type of nomination was meant for other people and not me. Prior to the event I prepared my losing acknowledgements, feeling honoured simply to be nominated. I was already in the Second Cycle of the research and thought I would use the event to mingle with organisations to see if I could get them involved in my research.

Today, is the awards ceremony, a glamorous black-tie affair on the grounds of Bangor University attended by dignitaries, peers, academics and other professionals within the procurement sector in Wales. There were lights and cameras rolling, a glamorous stage, formal speakers; there was even music played as award winners were announced, resembling something you would see at the large award ceremonies on TV. Needless to say, I felt out of place.

As the night progressed, it finally came to my category, Young Professional of the Year. Caroline Nicolas (United Nations Commission on International Trade Law) took to the stage to award this category, which only added further to my nerves. To my astonishment, I was announced as the winner for this prestigious award. My husband, who was recording the event, instantly reacted and cheered "wow", before turning the camera to me; looking back at the footage, I appeared stunned and shell-shocked. My work was commended for challenging the status quo, involving the community and for making an impact. I would have never imagined winning a National Award. I can honestly say that this represents by far one of my greatest achievements and proudest moments of my life. That evening, I had large public organisations approaching me to be involved in my research, rather than the other way around.

6.4 Micro Drivers

6.4.1 Cognitive

The data strongly suggests that cognitive pressure connected with individual passion and contributions, which work together to support the implementation of LCP. The data identified two aspects: passion and contribution. This was present in both groups. These two factors characterise someone's desire to *'want to'* (Palthe 2014). Such individuals have accepted a certain way of thinking about sustainability and have the desire to support LCP. Although they are inextricably intertwined, passion and contribution are discussed in turn below.

Passion

Passion as a theme was mentioned within both groups. The extract below identifies the importance of an individual's cognitive belief and values for driving LCP.

> *"It is about the passion people have. You have the real champions who live and breathe LCP. I know there are laws and the rest in place pushing things forward, but there are also these people to make things happen. Without them fighting it out, showing how and what can be done we would all be sitting around hoping for the best."*
>
> *Category Manager B*
>
> *NHS Wales (GA)*

Although passion was reported by both groups as a key driver, the findings especially identify the passion displayed by certain individuals in Support organisations (GB) as a key driver in moving the LCP agenda forward. Table 6.4. presents examples of such personal passion.

Table 6.4. Passion from support organisation participants

GB	Title	Illustrations
Support Organisation 1	Consultant A	*"I've always been passionate about climate change. I think I did a project at school when I was about 13 on it. It all started from there. I did Engineering Science at Oxford and I studied a number of renewables and climate change modules."*
Support Organisation 2	Marketing Manager	*"I was a very enthusiastic environmentalist when I was a teenager, did all the things that you usually do… I went back to university when I was 40 and started with an environmental science degree, then went on to do a sustainability Masters in Cardiff University, and then went on to do an MBA, so I kind of joined the loop with this whole notion of how our economy works and where sustainability fits into that. Because I think,*

		when I was younger, I was a very keen environmentalist but I always felt it was a bit extreme and didn't have a very balanced approach, so when the theories around sustainability and later on the circular economy came along, those I found particularly appealing because there was a sense of balance in there, which sort of sits well with the way I think, so."

Table 6.4 illustrates the longstanding passion, values and beliefs held by these Support Organisation participants. Currently, research into SPP discusses the role of individuals in terms of *'individual motivation'* (Thomson and Jackson 2007; Trindade et al. 2017). This research explains how this relates to the passion held by individuals and how this, ultimately, drives LCP. Moreover, it demonstrates how individuals with such beliefs seek out and fulfil roles that exemplify their beliefs. These individuals are often identified in their respective fields as *'champions'* or *'sustainability champions'*, which are two phrases that recur throughout the findings, but no reference to the term *'champion'* exists in extant SPP literature. Peattie (2005a; 2005b), notes the implementation of sustainability is often in practice conducted by these individuals. The current SPP research would benefit greatly from conducting research in the field of institutional entrepreneurship within the context of sustainability. Overall, Micro level drivers appeared to be cognitive-based. Procurement Head B (NHS Wales, GA) explains:

> *"The reason I think my director asked me to chair the SD group is because I've got an interest in it anyway. So, it's one of the things that I've always had an interest for. Putting me in that place was a perfect fit"*
>
> *Procurement Head B*
>
> *NHS Wales (GA)*

The research findings confirm that there are individuals with a longstanding affinity with sustainability and the climate change agenda and are recognised as pioneers driving the sustainability and LCP agendas forward. This is evident in the data when participants continually cite specific names when discussing the kind of passion that characterises the sector. Due to anonymity, these names are not presented here. However, this finding adds to the literature by showing how placing individuals with strong cognitive beliefs into the right positions can lead to the effective implementation of LCP.

Contribution

Contribution is identified as a driver by participants in both groups. This also connects to the notion of *'influence'* and *'power'* within institutions (Mohamed 2017), because such individuals use their roles to mould the position with cultural expectations. Contribution is distinct from passion insofar as it identifies the tangible contributions made by individuals. A Policy Implementation Executive (Welsh Government) referred to the work of individuals in Support Organisation 3 and the CCCW in the following extract:

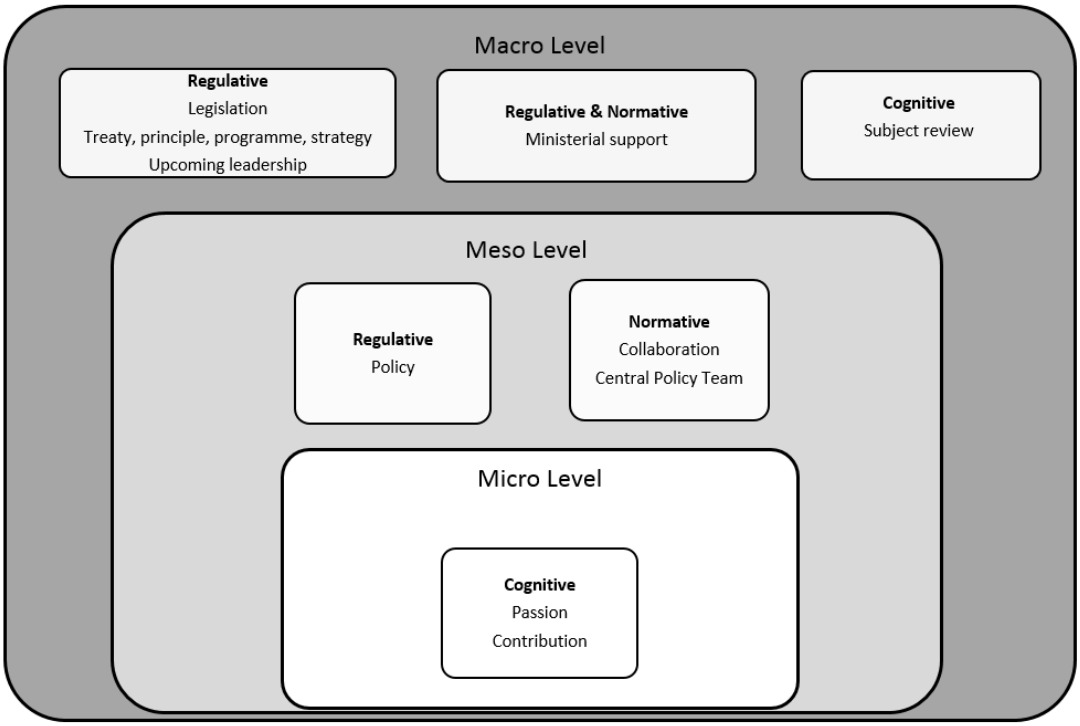
> *"What I will say about the WBFG Act and the Environment Act, neither bits of legislation are, shall we say, beautiful. It's not very elegant legislation. But, I'm immensely proud of my colleagues who had the idea, had the courage, had the determination to implement those two bits of legislation because they may turn out to be rubbish. But what they are attempting to do is really ambitious, it is really forward thinking, is really admirable, and I'm really proud of them, hats off to them. Because we're making an attempt."*
>
> *Policy Implementation Executive*
>
> *Welsh Government (GB)*

These findings confirm that individual contributions can have a significant impact in driving forward LCP. Findings from both groups confirm that when a contribution is combined with passion it provides encouragement within the procurement sector for other individuals to strive towards LCP. This represents a key contribution to extant literature in this area. The study indicates '*institutional entrepreneurship'* is taking place. Institutional entrepreneurship was introduced in 1988 by Paul DiMaggio. Researchers outlines institutional entrepreneurs are actors who leverage resources to create new or transform existing institutions they value highly (DiMaggio, 1988; Garud et al. 2007; Maguire et al. 2004). They can be organisations or groups of organisations (Garud et al. 2002; Greenwood et al. 2002), or individuals or groups of individuals (Fligstein 1997; Maguire et al. 2004). Research outlines such actors contribute to changing institutions despite pressure towards stasis (Creed 2002; Holm 1995). This study identified individuals who are passionate and trying to contribute to LCP. These individuals have even pursued education in that area and taken up on roles which specifically complimented their desire. There are different perspectives to institutional entrepreneurship. Battilana et al. (2009) in their view, note, institutional entrepreneurship must fulfil two conditions to be regarded as institutional entrepreneurs; (1) initiate divergent changes; and (2) actively participate in the implementation of these changes. Only actors

who initiate divergent changes, changes that break with the institutionalised template for organising within a given institutional context, can be regarded as institutional entrepreneurs (Amis et al 2004; Battilana, 2006; D'Aunno et al. 2000; Greenwood and Hinings 1996). Taking this view, the study outlined, the work of individuals in CCCW and Support Organisation 3 confirms both elements have been met and these individuals have actively contributed in public procurement from the Micro level right to the Macro level where they have contributed towards legislative change thus driving the LCP agenda forward.

To conclude this section a conceptual model has been created encapsulating the drivers for LCP, displaying drivers over three levels, placed within three pillars of IT. This can be found in Figure 6.1. Next, a brief answer to RQ2 is presented and the section is then concluded with a summary table including all the major drivers with additional commentary from participants, which not already included within the chapter.

Figure 6.1. Driver Model



RQ2: What are the major drivers of LCP within the public sector, and how do they operate?

An analysis of the major drivers is presented earlier in this chapter. In a digestible form, the above model, succinctly presents, the major drivers of LCP on each level. The findings indicate how IT is an expedient lens through which to observe drivers. In contrast to current SPP literature which reports that regulatory drivers (Kraft and Furlong 2007) are the predominant drivers, this study has outlined that, although there are indeed regulative drivers, normative and cognitive drivers also of paramount importance. Grob and Benn (2014) note that IT has hitherto dominated literature on drivers. This section has also explained the interconnectivity between the different levels and how institutional pressure is put in place through not only regulation but human agency (Ministerial support) and non-human agency (Stern Review). Though it may appear straightforward to accept regulatory drivers as the key catalytic force towards LCP, this study has demonstrated that the regulatory aspects of institutions are just one aspect that drives LCP. Rather, LCP is also driven by normative and cognitive pressures, a finding which represents a key contribution to extant SPP literature. The findings have also shed light on the influence of the Micro level and its interconnectivity with the Macro level. Moreover, given that people influence laws and society, they also contribute to the Meso level.

Table 6.5. Summary of Drivers

Levels	Concept/ Theme	Group	Illustrations of findings
Macro	Legislation	A&B	*"The Well-being of Future Generations Act and the Environmental Act play a major role in delivering low carbon procurement. Its law, regulation"* (Group A) *"It [drivers] will be the Future Generations Act and the Environment. WBFG Act have specific targets in terms of carbon."* (Group B) *"As part of the agenda in the UK, the Climate Change Act has cemented the area into the UK. It is of great importance and this Act has been an important lever."* (Group B)
	Treaty, principle, programmes and strategies	A&B	*"The statutory requirements by legislation become our strategies. Alongside that, we will probably need something that picks up the adaptation element of the current climate change strategy because the budget is about the mitigation."* (Group B) *"Ever since the Kyoto Protocol the lever has been down, and the agenda has been moving forward."* (Group A) *"We've developed a climate change strategy for Wales, which sets devolved and all emission targets for Wales outside of statutory mechanisms."* (Group B)
	Upcoming leadership	A&B	*"Now the FG Commission is in place, things are about to change. You see the looks on people's faces, it's a topic that's not going away and people will and should rightly so be held accountable."* (Group B) *"The FG Commission is going to have a big impact there, it is going to formalise things a lot more, it already is."* (Group A)
	Subject Review	B	*"The Stern Review shaped the way forward. It put into perspective there is a real consequence of not doing anything. This in itself has given the country the push it needed."* (Group B)
	Ministerial support	A&B	*"Sustainable procurement, in which low carbon procurement sits within, is hosted by the minister. There is a name to the backing which makes a difference."* (Group B) *"Don't get me wrong, I appreciate there is a minister backing this agenda, however, on the ground level it doesn't make much difference. No one cares bla bla bla has backed it in the real world when we are trying to go out to try to implement LCP. Ministers are always backing one thing or another."* (Group A)
Meso	Public Procurement policy	A&B	*"We follow the procurement policy and as part of the policy low carbon is taken care off."* (Group A) *"The procurement policy in the public sector has laid bare what the expectations and requests are for procurers. It's quite clear."* (Group B)

	Central Procurement Team	A&B	*“<central policy team> have a special place in my heart. I’ve been in the industry a long time and remember the days when we had little guidance in the area. They come as a breath of fresh air. They provide some level of guidance within procurement and in the area of things like low carbon and sustainability.”* (Group B)
	Collaboration	A&B	*"I'm not going to say to you the Commission are the biggest driver, but they are a good driver. It's provided some sort of even ground to talk about this stuff and share the experiences we have gone through and things we have encountered. This in itself is more mutually moving things forward. They invest their time on the topic and that is what matters"* (Group A)
Micro	Passion	A&B	*"I used to argue with people about this every day. I would argue that it is a good thing to add low carbon into procurement, if we don't make it happen, who will? I feel very passionate about this." (Group B)* *"We only have one world, like it or not. I'm proud and passionate in making sure we protect it. If that means putting myself on the front life so be it. Sometimes in life you take the role that is needed, not what is handed to you."* (Group A)
	Contribution	A&B	*"When I was with <local authority, name omitted>, we had staff in the procurement team who were really interested in pursuing the sustainable procurement agenda, and it was really down to that staff that things happened there, I would say, because of personal passion, interest and commitment."* (Group B) *“There’s <name omitted> in our team who is so passionate about the area. She looks for ways to make a contribution, puts herself out there to make a difference. It’s people on the ground who are really driving it all forward.”* (Group A)

6.5 Macro Enablers

6.5.1 Regulatory

Enablers aid the implementation process of LCP and complement the work of drivers, at times they are referred to as *'facilitators'* (Brammer and Walker 2011; Walker and Brammer 2009). This section presents the enablers of LCP on Macro, Meso and Micro levels, and will demonstrate how they support the drivers of LCP as well as interact with the barriers. Macro enablers include devolved powers, transition and alignment, which fall within the regulatory pillar of IT.

Devolved Power

The devolved legislative powers in Wales support the implementation of regional legislation. The concept of devolved power is new to the SPP literature. GB participants reported that devolved power was a key enabler of LCP. A Policy Implementation Executive (Welsh Government, GB) states:

> *"I think that the legislation we have in Cardiff, in Wales now, we have an opportunity to step ahead of the likes of England actually. This is because we have devolved power to introduce such legislations. With the economic policy in Wales, you couldn't put a cigarette paper between that and the UK economic policy. It seems to be entirely the same, whereas the WBFG Act and the Environment Act has the possibility of driving that kind of mind-set that we are thinking about doing something different. That transition is going to be tremendously difficult because we don't think in that way, and Wales isn't and hasn't necessarily been a particularly ambitious country. We're scared to fail, but we're also scared to succeed as well."*
>
> *Policy Implementation Executive*
>
> *Welsh Government (GA)*

The extract emphasises the unique position the WAG finds itself in with respect to its autonomy to introduce its own legislation distinct from the UK government. This has enabled the WAG to surpass the UK in terms of its policies on sustainability and LCP. Additionally, the final sentence in the extract highlights the hesitance and apprehension around the entire agenda, because Wales is presenting itself as a pioneer paving the way forward for a sustainable, low carbon economy, which can be a daunting endeavour in light of the fact that it is one of the few countries formally foregrounding sustainability within its policy making

and holding an industrial heritage, which was unstable. This, once again, connects to power and influence within the institution (Mohamed 2017; Palthe 2014).

Transition and Alignment

Transition and alignment concern the fact that institutions shift and realign themselves across time. The findings demonstrate that there has been a prior misalignment within the institution, and that changes are taking place to produce realignment. North (1991) outlines formal regulatory institution require a level of *'maintenance'* to continue to be effective. The following examples of transition and alignment are covered in turn:

EU Procurement Directive 2014/24

GA participants reported that recent changes to the EU Procurement Directive have served as an enabler. The Directive permits open dialogue which was previously prohibited during the public procurement tender process (including the pre-market stage). This finding lends support to the work of Chiarini and Vagnoni (2015). A procurement Manager (Higher Education 2, GA), explained that changes to the EU Procurement Directive allow for dialogue, but that such discourse must be monitored to ensure the Directive is not breached. Policy Official B (CPT, GB), Category Manager A (NHS Wales) and Procurement Head B (NHS Wales) from GA all support the Procurement Manager's (Higher Education 2, GA) comments that new stricter rules are in place pertaining to how dialogue takes place. This highlights that, although regulation has been changed which will enable LCP, this still needs to be supported by other regulatory and normative systems, such as professional training. At this juncture, it is worthwhile to note that it is currently unclear whether Brexit will weaken or strengthen LCP regulation in Wales as there is uncertainty whether the EU Directive will remain binding in the UK. This uncertainty about the future of the UKs membership with the EU is discussed further within the barriers section of this chapter. Although the EU Procurement Directive, in the context of promoting discourse, is perceived as an enabler, it is equally considered a barrier due to its conflict with Welsh legislation which is also discussed in the barrier section.

Leadership transition

Interviews with GA participants indicate that Wales is going through a process of transition, due to the introduction of the FG Commission and the newly appointed FG Commissioner who will lead and support the sustainability agenda going forward. As aforementioned, this person is a carrier of regulative pressure. Senior Official (GB) observes:

> *"It is quite an exciting time, because of the legislation [WBFG Act]. <Name omitted> is a statutory Commissioner, so has legal duties and powers that <name omitted>, in his role as commissioner, never had. So, hopefully, organisations out there will start taking it all a bit more seriously…."*
>
> *Senior Official*
>
> *Commission (GB)*

This participant welcomes the appointment, noting that the CCCW had less institutional power vested in them from the government. The participant suggests that the FG Commissioner will have greater scope than the CCCW to sanction, penalise and fine organisations, which constitutes a key enabler of LCP. The idea of sanctioning is part of the regulatory pillar of IT (Hogson 2006). This finding contributes to SPP literature by identifying how formal pressure is being placed on procurers. The theme of *'transformational leadership'* appeared throughout the interviews, rather than leadership alone. Although sanctions are considered to be an enabler as part of the transition, Zucker (1977) explains that sanctions may deinstitutionalise an institution's cognitive pillar. That is to say, people and organisations may move away from LCP. As aforesaid, given the infancy of the FG Commission, limited evidence is currently available to effectively measure whether there have been any notable changes and improvements since the appointment. Hence, for now it is recognised as a Macro level enabler.

<u>Aligning Government</u>

GB participants mention how a recently implemented government programme (REW) encouraged collaboration with support organisations to engender knowledge transfer. Alignment as a process was also mentioned, specifically promoting collective procurement whilst discouraging silo behaviour. Such government programmes and initiatives are indicative of the intention to align policy from aspirational objectives to practical achievements. The concept of government alignment is new to SPP literature. Whilst Walker and Brammer (2009) touch upon the topic referring to *'aligned with organisational goal'* as a *'facilitator'*, this study moves beyond this literature by broadening the discussion of alignment. Policymaker A (Welsh Government, GB) outlines alignment at a government level:

"When the new Tory government came in, they undertook a landscape review and were moving away from the grant funding that they had. So, at the same time in Wales, we were looking at the direction that we needed to go in. Now, grants are a specific vehicle for a specific purpose like LCP. What we were actually looking at here is, what do we need to take forward activity in Wales, aligning things up…"

Policymaker A

Welsh Government (GB)

As one can discern from the above extract, Wales is pursuing a more unified approach towards LCP and sustainability. This alignment would strengthen the institutional pressure in the long-term to implement LCP. The primary aim in Wales is to develop a consistent synergised approach for all organisations in relation to LCP, which, in turn, would increase institutional pressure and encourage *'isomorphism'* - the degree to which organisations begin to resemble each other due to the pressure to conform (Ashworth et al. 2009). The interviews with GB participants strongly suggest that there has been a notable shift away from their previous normative habit of silo behaviour. In this context, silo behaviour represents patterns of behaviour amongst individuals or functional silos, which essentially work in isolation as opposed to in unison with one another. Policymaker A (WAG, GB) states:

"We're drawing together, in a more integrated way, aligning Wales. So, we're moving outside of individual and functional policy silos, which has been the tradition."

Policymaker A

Welsh Government (GB)

Through alignment, the institutional pressure becomes stronger and more coherent, a point which is supported by the following diary entry.

Diary: Change

September 2016

As I've been going out and about, the more I've observed that change is taking place every day in the public sector. It feels as if the sector is going through a significant transition. If I'm honest, I've seen a lot of different ways of working in the public sector. Much like a multi-national organisation, with so many departments, teams, layers and ideas, it can't be easy for them. There are meetings about alignment, meetings about the new commission, and there is a positive buzz in the air.

What stands out from this section is that though the public sector is going through transition and alignment it is a form of *'maintenance'* of the institution. Formal institutions require maintenance to continue to be relevant and effective (North 1991). Khan et al. (2014 p. 469) also points out *"the formal institutional framework tends to be under constant state of development, and therefore unstable."* This can be outlined in change in legislation, having to go through transition and alignment within the regulatory pillar to continue its relevance and pressure. Bouly (2013 p. 1) notes a large amount of institutional work is required to maintain institutions, that is, to support, repair, or even recreate them. Lawrence and Suddaby (2006) and Quinn-Trank and Washington (2009) further note, maintaining institutions does not merely consist in preserving stability and guarding against change, especially because persistence is to be achieved in the context of evolving environments. The transition and alignment that is being observed in Wales can be considered as the maintenance, the adaptation to the evolving environment. Wales is going through a clear step-change in the area of sustainability procurement (including carbon). As a result, the government appears to be taking stock of where they are. Reviewing the findings Wales is already making a clear attempt to consolidate some barriers and inconsistency in the area addressed in the research. This also connects the new FG Commissioner being appointed with regulatory power to support the WBFG Act. This also connects with the discussion of regulation conflict and recent changes, alignment and lack of alignment, transition and alignment the sector is currently going through to support LCP. The need for alignment is recognised in IT for achieving consensus and change, which leads to legitimacy and institutional logic taking place.

6.6 Meso Enablers

Meso enablers fall within the regulatory, normative and cognitive pillars of IT. SPP literature is dominated by research at Meso level (see Brammer and Walker 2011; Meehan et al. 2017; Palm and Backman 2017; Walker and Brammer 2009). One explanation for this would be that the actual procurement process takes place at this level.

6.6.1 Regulative and normative

To begin, at Meso level regulatory and normative pressure was observed to be operating together. For example, the procurement process involved formal rules and processes and are spread across the public sector through work-based norms. The procurement process is considered as an enabler by Brammer and Walker (2011); Michelsen and Boer (2009); Parikka-Alhola et al. (2009); Testa, et al. (2012) and Walker and Brammer (2009). Enablers within the procurement process will now be discussed.

Procurement tools

As part of the procurement process procurers are asked to follow the policy and use sustainability procurement tools. Diofazi and Valko (2014) stress the importance of tools in this process. Policy Official (CPT, GB) explains:

> *"In Wales, through the procurement statement policy, every public sector organisation is obliged to use procurement tools created by <central procurement team>".*
>
> *Policy Official A*
>
> *CPT (GB)*

This extract stresses the importance of utilising procurement tools that adhere to the WPP and establish normative habits. The use of such tools and the formal processes of buying have become part of the procurer's daily work life, and, as such, has become the norm. This is where, according to Meehan et al. (2015), regulatory and normative pressures entwine. This research adds to the literature by providing a comprehensive overview of the tools (a suite of procurement documents) and how they operate to enable LCP. At present, there is limited coverage of the tools used during the procurement process in extant SPP literature. GA participants (procuring organisations) noted that the tools created by the CPT both served as enablers and barriers, the latter of which will be covered later in the chapter. In contrast, GB participants, with the exception of the CPT, did not identify tools as enablers. Although two GB participants were aware of tools, they were unfamiliar with how they

worked and what they comprised of. This lack of awareness can be explained as stemming from the fact that GB participants, except for the CPT, do not necessarily create or use the tools, whereas procuring organisations (GA) have daily interactions with them. CPT participants from GB explained that the tools were designed to support procurers to facilitate LCP by spreading normative pressure whilst promoting homogenous working habits, although it is perhaps to be expected that positive remarks towards tools would come from the body that created them. The Procurement Route Planner[21] is the holding platform for the suite of procurement tools. An overview of the main tools and how LCP is implemented within them is provided in Table 6.6.

[21] http://prp.gov.wales/?lang=en

Table 6.6. Procurement Tool Overview

Name	Stage of use	Researcher's comment on carbon consideration
Sustainability Risk Assessment (SRA)	• The SRA is completed at the initial assessment stage of a contract or framework. The threshold level to use the SRA is set as £25,000. • Answers to the questions are linked to the minimum requirements that should be applied in the procurement process to reduce adverse impacts.	• The SRA tool is designed to make sure that environmental, social and economic (sustainability) issues are assessed, understood and managed by assessing the life-cycle impact of a good or service using a resource efficiency approach. This, in turn, is expected to reduce carbon.
Supplier Question Information Database (SQuID)	Used during the implementation of a tender: • Can be used in the pre-qualification questionnaire (PQQ) during the *'restricted'* process to determine which bidders should be invited to tender. • During the *'open'* process, this can be used in an invitation to tender (ITT). These questions are used as qualification questions to check the suitability of the supplier.	• The tool is used by buyers to generate a selection questionnaire using a risk-based wizard for each procurement project. • The tool is based around life-cycle impact and the resource efficiency approach. • Option available for buyers to ask for information on an organisation's EMS certification by an UKAS-accredited (or national equivalent). This covers Green Dragon, ISO 14001, etc. However, for this to be a requirement there needs to be a clear reason.
Community Benefits	• Tool to be completed annually on the anniversary of the start of a project or at the end of the contract for those contracts of less than 2 years and 4 months.[22] • Used for projects costing £2 million and over and focused on construction procurement. • Used by contract/project managers and primary contractors to measure the community benefits of Welsh public sector contracts.	• Community Benefits tool supports the Welsh Government's vision that sustainable development will be the central organising principle for Wales. • Carbon is covered though a resource efficiency and life-cycle impact approach. There is also a carbon reduction question (in percentage) available to populate.
Fitness checks and Maturity Model	The WPP commits public sector bodies to *"measure themselves against the Maturity Model, by undertaking an annual Procurement Fitness Check and reporting the recommendations and action plan progress to Welsh Government"*[23].	The model is there to help organisations understand where they are in terms of procurement capability and where they need to be; it consists of 8 sections. This tool was developed to illustrate incremental progress in the development of a public sector procurement function. An action plan is provided to develop procurement capabilities to an appropriate level for each organisation.

[22] http://gov.wales/docs/dpsp/publications/valuewales/140904-community-benefit-summary-en.pdf
[23] Welsh Government. Community Benefits. Delivering Maximum Value for the Welsh Pound – 2014

Speaking in relation to the tools exhibited in Table 6.6, one participant from GB, Policy Official A (CPT), noted that: "*The sustainability risk assessment is used quite widely…. the fact is that they've been widely used so those tools have been accepted in one form or another now*." This would imply that a norm has been established in that there is acceptance over their use. However, research by Meehan et al. (2015) makes the important point that just because these tools are used, this does not mean they are necessarily accepted. Nonetheless, procurement tools are becoming more widely used in public sector procurement and are considered as enablers of LCP. Examination of these tools showed how they were a platform that supported the implementation of LCP when using the life- cycle approach to procuring. Tools are in place and designed at different stages such as pre-qualification (Sporrong and Brochner 2009). The implementation of procurement fitness checks takes place annually, which works as a regulatory monitoring mechanism, from which organisations are allocated a position on the maturity model. This is used to monitor, audit and identify where tools have not been used and encourage the use of tools. A Procurement Head B (NHS Wales, GB) stressed the importance of sustainable procurement and explained that the fitness checks were helpful for allowing management to monitor whether procurers were deviating from the use of tools. This fitness check and the maturity model therefore act as a mechanism for instilling normative expectations within individuals and organisations. The actual tools are carriers of pressure (Scott 1991) on individuals and organisations that serve to instil sustainability and its attendant discipline of LCP. Where the tools are used across the public sector, pressure is put in place that is expected to increase homogeneity (Scott 2014).

Supplier requests: certifications and policies request

As part of the procurement process, procurers may request EMS certification or internal environmental policies from suppliers. Certifications and environmental policy requests are viewed as enablers by GA and CPT only (GB). ISO4001 and Green Dragon (Welsh EMS) were the most commonly cited certifications. The SPP literature confirms that the operation of EMS is taking place (Fet 2010; Ho et al. 2010; Sporrong and Brochner 2009; Testa et al. 2016,). This research supports the literature. Whilst Darnell et al. (2008) report that EMS have become mandatory in certain countries, however, in Wales EMS are only obligatory upon request. Specifically, EMS operate to instil normative pressure on the expectations of suppliers, which over time, as more suppliers come to hold EMSs, they start to resemble each other as per normative isomorphism (Grob and Benn 2014). Additionally, suppliers with

EMS' are given preference over suppliers without, which pressurises the supplier base to conform and obtain EMS' to display their legitimacy and survive (Deephouse 1996).

Public sector organisations certifications and policies

Normative pressure in the public sector has been instilled through encouraging organisations to hold certifications and adopt policies that support LCP. Participants from both groups confirmed that when public sector organisations held their own EMS certification this was an effective enabler of LCP:

> *"We have internal certifications which carry low carbon through, once products and services procurement takes place… "*
>
> *Procurement Head A*
>
> *NHS Wales (GA)*

The findings indicate that institutional pressure placed upon organisations are then placed onto the supplier to conform (Scott 2014). Obligations placed on public sector organisations to seek legitimacy and adhere to operating EMS', such as 14001 at the NHS Wales. Although recent literature discusses EMS requests for suppliers, this research adds to this literature by showing that procuring organisations are also encouraged to hold EMS' or equivalent policies, essentially leading by example.

Environmental category

Whilst extant SPP literature notes that the procurement process facilitated environmental criteria being built into the tender documents (see Nissinen and Rita 2009; Palmujoki et al. 2010; Stofova and Szaryszova 2016), this research shows that at times this is not enough for LCP products to compete. As a result, procurers have created a low carbon environmental category into the procurement process to enable LCP. This is indicative of normative behaviour on a small scale. Adopting this criterion in the initial stages of the tendering process ensures that LCP is considered.

> *"I get it through using a separate environment product category. So, we have paper, the bog-standard paper category but then we have recycled paper category. I do it with pens too. This allows recycled paper to be compared with other recycled paper options during a tender, like-for-like. Otherwise, it's hard to get them through as they are more expensive."*
>
> *Procurement Manager A*
>
> *Higher Education 2 (GA)*

This strategic approach is considered to be a mechanism for implementing LCP insofar it creates additional category during the tendering process to ensure LCP is facilitated and not ignored.

Collaboration with support organisations

Collaboration with support organisations is a new idea within current SPP literature. The SPP literature is dominated by discussions on the implementation of SPP and its attendant fields through the lenses of the suppliers (Hall et al. 2016; Loader 2013; McMurray et al. 2014). This study contributes to extant SPP literature by demonstrating how collaboration during the procurement process with external specialists enables the implementation of LCP. To begin, Markets Manager (Support Organisation 2, GB), who is involved in the procurement of sandwiches for the NHS, stated:

> *"We support the NHS with food waste. We did some work on food that's served to patients and there's some really good practice in hospitals, e.g. different portion sizes during procurement. In other hospitals everyone gets a huge meal, not everyone wants it, they're in hospital feeling ill. Huge food waste. We have that knowledge and get involved to transfer it into procurement activity."*
>
> *Senior Executive*
>
> *Support Organisation 2 (GB)*

Collaboration with support organisations takes places through the REW programme discussed earlier in the driver section. Both groups recognised the work of support organisations in implementing LCP, and that this support should not be overlooked. This is because they operate as carriers of institutional pressure from the government. This programme is managed by the government to help support the skills barrier in the sector with specialists in LCP attending the meetings to provide advice during large scale procurement. Collaboration between support organisations (GB) was applauded by both groups because they support resource efficiency, language transition, provide technical

support, as well as training in the area. There appears to be a level of dependency on support organisations and therefore they are welcomed during the procurement process. This contributes to the literature by casting the analytical examination on the agents involved in procurement, which is currently not addressed. Support Organisation 2 (GB) was the most recognised of the support organisations. This may be due, in part, to the fact that it had its own allocated budget to address areas, such as waste and resource efficiency, along with public procuring. They would take part in meetings and provide specialist advice during the high value procurement process. The NHS Wales and Local Authority both spoke highly of their relationship with Support organisation 2. Despite the apparent success of such initiatives there has been a reduction in such schemes in recent years, which is addressed later in the chapter under the heading Meso level barriers. Collaboration with Support Organisations is recognised as both regulatory and normative pillars, within IT, as these organisations have a dual regulatory function, allocated and instructed by the government as well as a duty to assist and implement norms.

6.6.2 Regulatory

Internal Audits

The findings suggest that there is regulatory based pressure placed upon individuals and organisations to implement LCP through audits. Internal audits, in this context, differ to the checks conducted in the fitness checks and the maturity model. Internal audits were mentioned by Senior GA participants as being an enabler of LCP. These audits monitor and report the performance of individuals using tangible data. Findings indicated the use of such audits varies across the public sector. Procurement Head B (NHS Wales, GA) explained that internal audits have provided a process through which to monitor what procurers write in tools, such as the SRA, and go onto implement into tenders:

> *"Again, one of the big things we're trying to do now is to say, well, "you identify these issues within the SRA…how does that follow through to the procurement?" We are challenging staff now because it's all very well saying "this stuff's relevant, we're willing to take this into account", but how does that manifest itself in the contract at the end of the process? And what that's means is a lot more people are taking it a lot more seriously now when it comes to that question."*
>
> *Procurement Head B*
>
> *NHS Wales (GA)*

This extract confirms that procurers are taking audits more seriously as there is now the scope to question what action/inaction is being undertaken during the procurement process. Regulatory pressure is enforced here to challenge procurement activity and decision-making. Where pressure is placed, legitimacy is expected to be sought through the institutional framework. It is in this respect, audits are in effect carriers of regulatory pressure that are used to inflict *'power'* (Mohamed 2017). Such challenges lead to the need for *'accountability'* (Scott 2014). Accountability is expected to lead to conformity and homogeneity in the long-term. Although this is the expectation, GA participants (procurers) nevertheless still aired problems about the use of audits. This issue was raised by Category Manager B (NHS Wales) in terms of the idea of *'us'* and *'them'* in relation to audits, which serves as an early indication of *'interest'* and *'power'* (Mohamed 2017) within the institution. Later in the chapter the notion of 'de-coupling' will be examined where individuals disassociate themselves from all these regulatory and normative practices.

6.6.3 Cognitive

The data indicated there were strong cognitive-based enablers. This predominately existed on Meso level focused on life-cycle thinking, resource efficiency and the 'win-win' situation.

Life-cycle thinking

Life-cycle thinking as new way of thinking was outlined as an enabler at Meso level of LCP. Following the examination of the SRA, it was established that the life-cycle concepts of *'remove, reduce, reuse, recycle'* are promoted by the SRA tool, because they encourage procurers to explicitly consider these four options when buying. This finding lends support to the work of Parrikka-Alhola and Nissinen (2012) who also refer to life-cycle thinking. The extract below from the Policy Official B (CPT, GB) explains that there is an element of the new way of thinking:

> *"The way we promote it [low carbon] to people through the SRA is through a life-cycle thinking approach. Within that, you need to think about resource efficiency, so you may need to buy as little as possible, the things you buy you need to assess the impact, the materials that may go into it and make sure you minimize all the adverse impacts and maximise the benefits from that…and if you can buy legitimately and within reason, without countering any EU procurement Regs…. All that ties in, doesn't it?"*
>
> *Policy Official B*
>
> *CPT (GB)*

Whilst it has been identified as an enabler, life-cycle thinking presents many complexities, as identified through the rhetorical question towards the end of the extract. At present, the consensus is that life-cycle thinking is an enabler of LCP at the Meso level. Life-cycle thinking can appear as a move complex matter as outlined in the diary extract below:

Diary: More than just buying

July 2017

Whilst my husband was watching an episode of Top Gear, I was surprised to overhear a crude joke made by the presenter, Jeremy Clarkson, which actually applied to me and my research. Jeremy's joke was how can a Toyota Prius, an electrical car, be deemed more environmentally friendly than a "gas guzzling" Land Rover Discovery, given that the Toyota Prius' components and the manufacturing of the car are done on a global scale to make it as economical as possible in use? He cited an example of how the nickel that is used to make the battery that powers the electric motor comes from a mine in Canada, which is a 'dirty' business to start with. The nickel is put on a cargo ship and brought to Europe where it is then refined and sent to china to be turned into foam, before finally being taken to Japan to be put into the batteries and fitted into the cars. As he put it, it is 'so complicated' to make a Prius in the long-term.

In essence, Mr Clarkson had understood and articulated the concept of life-cycle thinking, and the fact that not everything that is deemed environmentally or energy efficient may actually be so. On the grander scale, procurement involves production, purchasing, use, reuse, disposal and even the recycling of a product. Adopting a narrow lens means missing vital elements, as procurers should not be looking simply at when an item is procured, or in delivery of the item (i.e. carbon emission through transport) but, rather, at the origin of the product and its "life cycle". I feel more of an in-depth understanding is required of carbon footprint and the carbon lifecycle.

The implication is that life-cycle thinking is complex and also indicates there is a need to look at procurement with a long-term view considering carbon, post- purchase as well as pre-purchase to understand full the impact.

Resource Efficiency

GB participants identified resource efficiency as another enabler of LCP. The phrase *'resource efficiency'* is defined by the European Commission as *"using the Earth's limited resources in a sustainable manner while minimising impacts on the environment. It allows us to create*

more with less and to deliver greater value with less input" (EC 2017). The term was also used by Policymaker A (GB), who explained that the aim was to achieve "*resource efficiency and circular economy and that carbon was part of that vision*". GB referenced resource efficiency and the strategic manner in which terminology was being conveyed to enable LCP:

> *"You don't talk carbon. They don't understand it. The focus is resource efficiency language."*
>
> *Senior Executive B*
>
> *Support Organisation 2 (GB)*

These findings add to extant literature by emphasising how cognitive based practices operate during the implementation of LCP. Although GB referred to these strategies as an enabler of LCP, Cycle One observed that some procurers were confused when simply trying to define the word *'carbon'*. Scope exists in future to examine if such strategic drives facilitate LCP, as at present there is little evidence available, given the infancy of these practices.

Win-win situation

It appears from the data that the Welsh Government was not explicitly pursing LCP on the grounds of it being a *'win-win'* strategy, but this strategy is being used by procurers. The behaviour of procurers appears to fall within the cognitive pillar of IT as it appears that some procurers now have innate instinct to pursue *'win-wins'* and are pursuing short-term cost savings to implement LCP. Brammer and Walker (2011), Cerin (2006), Walker and Brammer (2009) all identify that *'win-win'* strategies are being used. Porter and van deLinde (1995) discuss *'win-win'* primarily in terms of *'financial savings'*. In this study where financial savings were not connected to a *'win-win'* situation, it proved to be difficult to implement LCP. Cost as a barrier is discussed in greater detail in the section examining Meso Level barriers. Further findings centred on the fact that *'win-win'* was understood as a *'quick win'* as opposed to a *'long-term win'*, which adds a time pressure to the situation. This potentially conflicts with the idea of adopting life-cycle approach of a product or service where consideration is long-term, where at times the *'win-win'* would appear later in the life-cycle such as in the *'in use'* or *'disposal'* of a product.

Progressive culture

Sourani and Sohail (2013) and Trindade et al. (2017) recognise the role of organisational culture in enabling LCP. Culture is invariably taken for granted within the institutional framework (North 1991). This thesis uses the definition of culture advanced by Spencer-Oatey (2008 p. 3): "*a fuzzy set of basic assumptions and values, orientations to life, beliefs, policies, procedures and behavioural conventions that are shared by a group of people, and that influence (but do not determine) each member's behaviour and his/her interpretations of the 'meaning' of other people's behaviour.*" This research has demonstrated the centrality of culture during the implementation LCP. The relevance of developing a progressive culture appeared in discussions with both groups, where it was deemed to be a key enabler. Similarly, a negative culture is deemed to be a barrier (as will be discussed later in the chapter). The introduction of CPT was designed to promote a positive cultural shift towards *'sustainable procurement'* in the public sector. Cognitive-cultural behaviour appears to be moderate in LCP. This research concludes that some public organisations are more progressive than others. This is because cognitive-culture is deep routed and often taken for granted (Scott 1995). Shifting people from one culture to another is not straightforward. Within this study, participants from both groups observed that NHS Wales had a progressive culture compared to others. This suggests that when NHS Wales aligned their culture with CPT, this alignment was apparently successful because they are viewed positively by others. The results confirmed that GB participants Senior Official (Commission), Senior Executive (Support Organisation 1), Policy Official A (CPT) and Senior Executive B (Support Organisation 2) supported this view. The consensus appears to be that NHS Wales is one of the more progressive organisations in the public sector, with credit being given to their embracing of sustainability and, most notably, their pursuit of low carbon. Referring to the research diary data, it is evident that the NHS Wales is one of the public sector organisations that has in recent years received significant assistance from support organisations, which may go some way to explaining the progress it has made in terms of adopting a cultural ethos geared towards sustainability and LCP.

At times, to encourage homogeneity in practices, governments promote a forerunner, such as the NHS Wales in this case. This serves a *'mimetic'* function (Scott 2014), whereby other organisations are encouraged to *'mimic'*. This is analogous to a workplace setting in which an employee that is performing well is promoted to other employees to encourage them. In the case of the NHS Wales, it has clearly embraced collaboration with government funded support organisations, with the result being that when collaboration and cultural shift are

addressed in unison, then greater progress towards LCP is achieved whilst presenting a positive image to others within the sector. The findings from the NHS Wales demonstrate how organisational cultures can evolve over time to adapt, mimic and maintain organisational legitimacy through changes in workforce composition, alignment with larger social concerns, shifts in business focus or development of professional associations, further creating a complicated, somewhat more deterministic, multi-layered analytical perspective. The concept of organisational cultural change is a theme within IT. As culture shifts, there is an attendant need to support the changes taking place within individuals and organisations (Palthe 2014), as there can often be conflict between the old and new cultures. There are several take away messages from the Meso level enabler section. Principally, the research shows that enablers can complement and support drivers. Moreover, this study confirms that there are regulatory, normative and cognitive-based enablers at this level.

6.7 Micro Enablers

Micro level enablers of LCP include public service motivation, passion and contribution. Each fall within the cognitive pillar of IT and will be discussed now.

6.7.1 Cognitive

Public service motivation

There is hitherto no mention of *'public service motivation'* within SPP literature. Therefore, this study makes a small contribution to the field by pinpointing the role of public service motivation within LCP. Perry and Wise (1990 p. 368) define public service motivation as *"an individual's predisposition to respond to motives grounded primarily or uniquely in public institutions and organizations"*. The general proposition of public service motivation derives from the belief that public administrators are drawn to public service primarily because of a desire to serve others (Perry and Hondeghem 2008). Whilst public sector organisations operate at the Meso level, the cognitive pressure to implement LCP is here placed on individuals at the Micro level. Whilst there is some literature outside of SPP investigating public service motivation, such as Perry et al's. (2008) paper *"What drives morally committed citizens? A study of the antecedents of public service motivation"*, the SPP literature would benefit greatly from making a stronger connection with public service motivation. This research demonstrated that there as strong cognitive-base in participants responses:

"This isn't my money but there is a sense of duty here that it is spent according to what the public want. LCP is what the public, society want…"

Category Manager B

NHS Wales (GA)

GA participants explained that the fact that they were spending public funds motivated them to manage government funds more efficiently when pursuing LCP. This serves as an example of how cognitive-cultural pressure from society is placed upon such individuals to fulfil their obligation (Scott 2014). This moral consensus, and sense of *'acting in a responsible way'* is deep-seated (see. Selznick 1948) and informally instils pressure within the individual. Outside the SPP literature, within Corporate Social Responsibility (CSR) literature, the sense of acting responsibly is instilled through the cognitive pillar (Khan et al. 2014) who explored CSR practices in a developing economy (Pakistan) to recognise the operation of all three pillars of IT.

Passion

As aforesaid, passion and contribution are inextricably intertwined. 'Passion' was raised by both groups as a Micro level enabler, whilst, earlier in the chapter, passion was also reported to be a Micro level driver. The cognitive-cultural frame places pressure on individuals (Scott 2014) to support the institution. Senior Official (Commission, GB) and Category Manager A (NHS Wales, GB) connected passion to the contribution made by a named procurement individual in NHS Wales which resulted is major changes in procurement. This finding adds to the SPP literature. It was this combination of passion and contribution that they held, which led to the procurement of sustainable fish and low carbon procurement research in NHS Wales, which progressed the field of LCP within the NHS Wales. The author approached the individual who had been referred to by both groups and conducted an interview to gain an in-depth understanding of the importance of their passion for LCP. The participant emphasised that the importance of sustainability and carbon emissions made her want to contribute in this specific area in her role. Although the findings confirmed that passion was not guaranteed to result in achieving LCP, it was nevertheless still an enabler when connected to contribution.

Contribution

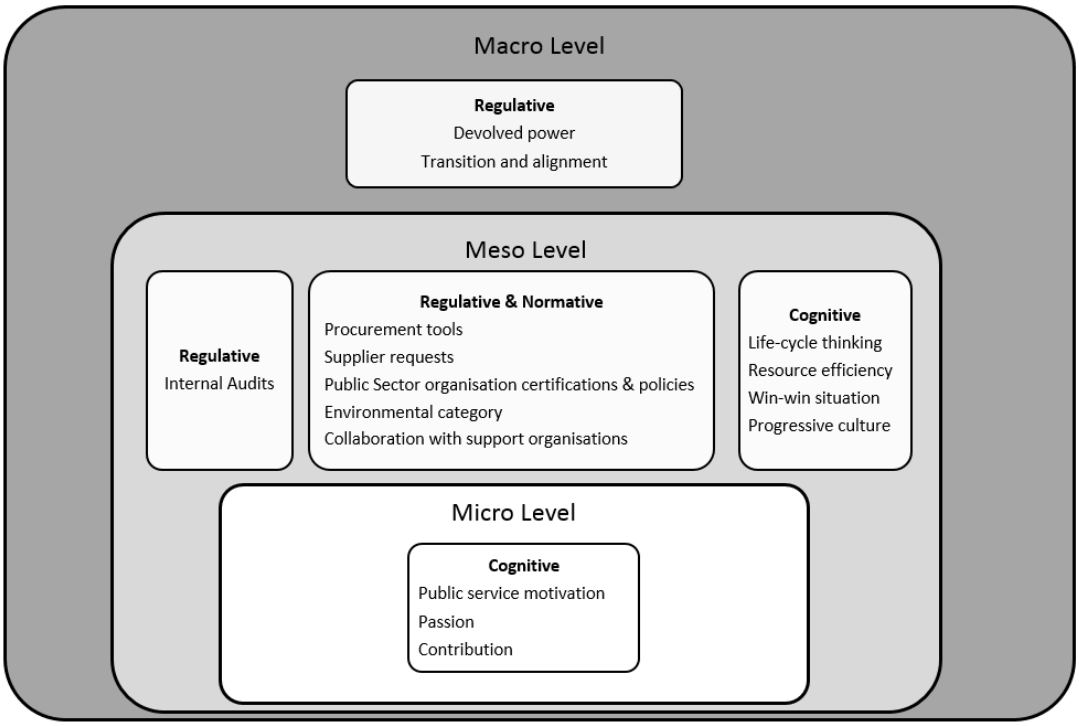
Findings from both groups indicated that simply having passion was not enough to implement LCP in and of itself, rather, there must be a contributory element on the Meso level which translates that passion into practice to achieve LCP. Consequently, passion and contribution are interconnected in the data. Participants from both groups identified specific individuals within the public sector who exemplified passion and dedication, and who had translated this into the implementation of LCP.

> *"Having passion for the topic is one thing but making it happen is another. I look for ways in my job to make that contribution. It might not be the biggest contribution but it's my contribution."*
>
> *Category Manager B*
>
> *NHS Wales (GB)*

This highlights the differentiation between passion and contribution. When they operate as an enabler, they are supportive of the system, whilst at times in the dataset they are limited to the work life in which they focus on contributing which is instilled by the cognitive pillar of IT. Institutional entrepreneurship was earlier discussed as driving LCP. It can also be an enabler. Battilana et al. (2009 p. 70) explain an institutional entrepreneur can also be someone without a *"grand plan for altering their institutions, or even awareness that they are contributing to changes that diverge from existing institutions, might thus end up acting as institutional entrepreneurs."* An example in the study would be the individual in NHS Wales who introduced sustainable fish and also pursued the LCP research, with knowledge developing along the way.

In summary, the section on enablers has presented some clear observations that all three pillars of IT are operating within the public sector in relation to LCP. Within the driver section it appeared that there was a strong regulatory pressure with different layers of regulation, while this enabler section has showed how change in the formal institution has been taking place to support LCP. This connects to the idea of *'maintenance'* of the institution which will be discussed later in this chapter. The data within the enabler section has outlined that though there are regulatory pressures, normative and cognitive pressure also operate enabling LCP. To conclude, this section a model shall be presented illustrating the major enablers over three levels. Following on a summary table with additional commentary from participants is outlined in Table 6.7.

Figure 6.2. Enabler Model



Some of the key observations from the model are that regulatory pressure operates on Macro and Meso level while normative and cognitive operate on the Meso and Micro level. There is also an interconnectedness between levels and pillars. Such as the cognitive Meso elements that support the regulatory and normative elements during the procurement process. It appears all three pillars are operating to enable the implementation of LCP. Drivers and enablers within IT are focused on applying pressure for legitimacy. Organisations and individuals respond to these pressures to *'attain'* and '*maintain*' legitimacy (Khan et al. 2014).

Table 6.7. Summary of Enablers

Level	Themes/ concepts	Sub theme/Concept	Group	Illustrations of findings
Macro	Devolved power		B	*"The devolution of power in Wales has really helped us. Handling our own affairs in the area of LCP. Without such powers, there would be no talk about the Environmental Act or the WBFG Act. We would just be singing of the same hymn sheet as England."*
	Transition and alignment	EU procurement directive	A	*"What you can do with that is find out if the market is interested in investing and helping you to deliver on it, and, secondly, whether they can bring any ideas to the table of new technology, new ways of doing these things. That's what pre-procurement dialogue is about. Procurement happening more collaboratively. The changes to EU procurement directives have opened that door to having that dialogue."* *"The new EU directives allow dialogue with the supplier base which will support the process."* *"We're drawing together, in a more integrated way. So, we're moving outside of individual policy silos, which has been the tradition."* *"The FG Act has been an importance step to integration, through its implementations the public sector is to move away from silo behaviour and act more integrated."*
		Leadership transition	B	*"It is quite an exciting time, because of the legislation [Well-being of future generations Act]. <Name omitted> is a statutory commissioner, so has legal duties and powers that <name omitted>, in his role as commissioner, never had. So, hopefully, organisations out there will start taking it all a bit more seriously…."*
		Aligning government	B	*"We are trying to move to a more joined up argument in terms of managing the public sector."* *"We needed to move away from that for a number of reasons, aligning Wales and the public organisation and what they need to deliver LCP."*
Meso	Procurement tools		A&B	*"A range of procurement tools are made available to operationalise the area to support LCP."*
	Supplier requests		A&B	*"As long as it's required, we make requests for suppliers to hold environmental certifications through the process such as green dragon, ISO14001, there's a number of them around. Carbon considerations are built within them I have been told. However, you know some SMEs are not gears around that, so to cater from them we give the option of environmental policy requests."*
	Public sector organisation holding		A&B	*"We have been encouraged to obtained ISO14001 to support LCP. I am aware others in the sector also hold it."*

	certifications and policy			
	Environmental category		A	*"Having a separate environmental category during tendering provides an even playing field to compare like-for-like. Apples with Apples. Not Apples with cheap pears, which are cheap, will do the job to some level and perhaps can win on price, but not deliver on sustainability and carbon. This would be scored accordingly as well, so as its part of the evaluation."*
	Collaboration with Support Organisations		A&B	*"We've worked with <name omitted> on areas of recycling products. They have been a God send. There, knowledge is fantastic. They are very well connected. They bring in the knowledge and skills we need at times. We are not specialists in material or waste, however it's important to get that right isn't it, in terms of carbon. What goes in is what comes out. However, my understanding is that <name omitted> support is governed by the government, it's not open to all of us. It's as and when its decided it's needed and directed by government. They would be invited to our meetings and give their inputs on the area."*
	Internal Audits		A	*"For every procurement over £25k we go through the tools, which is part of the Welsh government policy. We do all that and it's audited. I think at the last check it was 94% of all contracts showed they had it (SRA)...We have two quality auditors internally. So, they do the internal audit of that, we're also subject to Wales audit office audits periodically and twice a year, then as part of our ISO certifications we have an ISO audit, but that's done on a sample basis. (NHS)* *"Again, one of the big things we're trying to do now is to say well "you identify these issues within the SRA". We are challenging staff now by saying "how does that follow through to the procurement?" Because it's all very well saying "this stuff's relevant, we're willing to take this into account", but how does that manifest itself in the contract at the end of the process? And what that's meant is a lot more people taking it a lot more seriously now when it comes to that question.*
	Life-cycle		A&B	*"One of the main things that has helped with that is a central vision of what we want to achieve, and it is about resource efficiency and circular economy, it's all reducing carbon. We have instilled life-cycle thinking into the whole process. The procurers will be considering it without even knowing."*
	Resource efficiency		B	*"You make people feel bad about killing polar bears they're not going to work with you. Surprise, surprise, no one listened [reflecting on historical work]. There has been various other trends and a link to that the great big hog was behaviour change."* *"We use different language, I talk resource efficiency not carbon, I talk waste and landfill, etc. These are a bit more tangible than carbon."*

	Win-win		A&B	*"Low Carbon Procurement also aligns with other benefits, for example, health benefits, less site deliveries, waste reduction, which then makes it a win-win for all, it becomes a trade-off to some degree."* *"They talk about savings and how long it's going to last and things. But in effect they're talking about carbon but not saying the word."* *"Carbon is an easy sell when it's a win-win upfront, a win-win long-term isn't always as easy to sell."*
	Progressive culture		A&B	*"At NHS Wales, I think we're quite progressive. I'm basing that on conversations I have with my customer groups. For things like a catering group we've got, you know, sustainability as a standard item on the agenda. There's a lot of good practice here." (NHS)* *"The NHS are a step further than most public bodies and universities. They have done bits to recognise, how much emissions are associated with the products they buy and how efficiently they're used, and you hear a lot of these things where you know, they give 20 tablets to somebody, somebody uses two and throws the rest in the bin." (Support organisation)*
Micro	Public service motivation		A&B	*"When procuring the public sector, you are dealing with the public funds and there to serve public needs."* *"This is the civil sector, it's about people, society. The money is and should be spent on things they care about. That's what motivates me. People, society cares about lowering carbon in the atmosphere. In the background, pushing us, giving us that motivation."*
	Passion		A&B	*"<name omitted> managed to get them [NHS] to buy sustainable fish and stuff and <name removed> is also interested in lowering carbon too, so again she's very personally passionate and committed."* *"<name omitted> is a firm believer in climate change and the need to reduce carbon. She has a flare for it and holds it dear to her heart."*
	Contribution		A&B	*"Having passion for the topic is one thing, but making it happen is another. We have a number of people in the team who have the right attitude to embed carbon reductions and carbon considerations into procurement activity."* *"I enjoy my job and look for ways I can contribute to the bigger agenda. I get resource efficiency, carbon factored into my procurement task, it helps the bigger task at hand."* *"I think all the good work we've seen so far has been done by champions within an organisation."*

6.8 Macro Barriers

The research identified the main Macro level barriers to LCP centred around the regulatory pillar of IT, namely lack of government leadership; lack of alignment; and legislative conflict. Each will be discussed in turn now.

6.8.1 Regulatory

Lack of government leadership

Both groups, except for policymakers (GB), reported a lack of government leadership concerning LCP. Policymakers (GB) did not refer to leadership as a barrier, which may be expected given that it is in reference to them and they are unlikely to criticise themselves. Lack of government leadership is recognised as a regulatory element within IT, given that such leaders are carriers of regulatory pressure. The following extract from Policy Official A makes note of the weakness of the institutional pressure:

> *"Lack of leadership is the biggest barrier for LCP, when people aren't comfortable in the role that they're in and things they are doing. When looking at the bigger picture, that's when the leadership thing comes in, you've got to have someone at the top who can see across the public organisations and see how these things happen, and if you haven't got that type of leadership you're never going to get anywhere…. I think the barrier is due to the leadership not bringing a coherent focused version of it…."*
>
> *Policy Official A*
>
> *CPT (GB)*

This extract acknowledges the existence of some level of leadership, but also identified problems in this area. This notion was shared by other participants from GA who felt that, although leadership was present, it was inconsistent and fragmented thus in accordance with the work of Chiarini and Vagnoni (2015) and Ho et al. (2010). However, the findings go beyond their work by referencing leadership specifically at the Macro level. These findings stress the importance of leadership to instil LCP. For example, there was a strong indication that the lack of leadership was detrimentally impacting on the institution. With formal institutional there is a need for regular maintenance (North 1991). The recent legislative changes may also have played a role, specifically in terms of the transition of leadership with the closure of the CCCW and the creation of the FG Commission. It is simply too early to tell if the leadership will improve with the implementation of the new pieces of legislation and

the appointment of a new FG Commissioner who possesses legislative powers for the first time. In this respect, leadership can be understood as a carrier of institutional pressure (Scott 1994), without this there appears to be a weakness in the regulatory pillar. Participants suggested that strong leadership is required on a Macro level, because this then translates into the Meso and Micro levels as organisations and individuals seek guidance and direction. GA participants also complained about the lack of Macro leadership and how this created uncertainty over how to proceed in situations in which LCP potentially conflicted with other agendas. An example of uncertainty and individuals seeking leadership is presented in Meso level barriers.

Lack of alignment

As aforementioned, alignment has received scarce attention in SPP literature. This research has shown the importance of alignment, which operates as both an enabler and a barrier at a Macro level. With the recent legislative reforms, both groups reported that there is currently a lack of alignment which presents a major barrier. Participants in GB reported that the government has a lot of different legislation and policies**,** and that some are not aligned or work in isolation. This is also acknowledged by Policymaker A (Welsh Government, GB), who explains the weaknesses in the regulatory pressure as stemming from alignment issues:

> *"There is a need to link legislation together, including the National Procurement Act with sustainability legislation"*
>
> *Policy Official A*
>
> *CPT (GB)*

This statement is important insofar as it highlights that, although recent Welsh legislation (i.e. WBFG Act) embeds sustainability, procurement legislation does not specifically, which creates potential conflict with EU Directives. This emphasises the need for a unified legislative approach, which adequately covers sustainability and procurement. Glover et al. (2014) stress the need for alignment, as in institutions in which there is no alignment and there are competing logics in operation, this invariably leads to conflict and undermines an institution's legitimacy and authority. This would suggest weakness in the formal regulatory institutional pillar.

Legislative conflict: Procurement Directive VS Sustainability legislation and policy

There is limited reference to legislative conflict within extant SPP literature. This research builds on the work of Geng and Deberstein (2008) by identifying legislative conflict and demonstrating that, where it occurs, the regulatory pressure weakens. In such situations, coercive isomorphism will not be achieved. Under the EU Procurement Directive, procurers are not allowed to discriminate or show preference to a supplier due to their geographic location. Category Manager A (NHS Wales, GA) and a Food Procurement Specialist (NHS Wales) report that their team is strategically working *'around the EU Procurement Directive'* to try and encourage local suppliers, and, in turn, support the local economy and LCP on the basis that less delivery miles reduce carbon emissions. It is unclear whether this *'working around the procurement directive'* is lawful or otherwise. This finding also signals that Wales may have different priorities to EU.

Public sector austerity

Public sector austerity was raised by both groups as a Macro level barrier. Austerity is recognised as a regulatory pillar of IT as it is a government process to reduce public sector expenditure. Only Nikolaou and Loizou (2015) address austerity within the SPP literature. This study addressed this lacuna in extant literature by identifying how austerity constitutes a major barrier at all three levels. This will be addressed as we proceed through the chapter. Austerity in effect has led to *'short term'* thinking taking place. Policymaker B (Welsh Government) and Programme Manager (Support Organisation 2) from GB both referred to a period of *'austerity'* taking place within the public sector. It was reported that all parts of the public sector are affected by austerity, some more than others. According to the participants, austerity has led to changes to plans that have resulted in deferments and thus hindered the implementation of LCP. Participants from both groups noted that there was limited funds and reduced support. Austerity is present on the Macro level, but affects the public sector at the Meso level, which will be discussed in due course.

6.9 Meso Barriers

A significant finding emerging out of the interviews was that most of the barriers appear to exist at the Meso level. This will begin with a discussion on the lack of enforcement.

6.9.1 Regulative and normative

Lack of enforcement of procurement tools

Policy Official A (CPT, GB) explained that, although procurers are obligated to use the tools, there is no enforcement, sanctions, fines or penalties for not using them. This emphasises that this is therefore more a normative based pressure as opposed to being regulatory. In fact, this participant confirmed that the only penalty is *'naming and shaming'*, which, ultimately, makes procurers lax about applying tools and adhering to government policy, as they deem it to be an optional exercise rather than an obligatory duty. Meehan et al. (2015) outlines that sanctions are not the solution moving forward as people may simply *'de-couple'* and move away from the institution. During the interviews, enforcement in the public sector was considered to be a difficult subject given that the government would effectively be punishing itself, and any punitive fines would only reduce the finances of those who may already be struggling financially. Additionally, encouraging procurers to use procurement tools had decreased due to resource pressures within CPT.

Outdated Policy

GA participants displayed their frustration towards the WPPS which was introduced in 2012. Participants in this group reported that it should have been updated at this point. Specific reference was also made to the Sustainable Procurement Task Force's (Procuring the Future 2006) definition being outdated. With multiple pieces of recently enacted legislation, it could be that the WPPS is yet to be aligned to accommodate these recent legislative changes, however, there has been no confirmation that any update or change is due. Though regulatory pressures may be present, if policy is not sufficiently updated then institutional weaknesses will emerge (Scott 1995). This connects to the idea of maintaining the institution as formal institutional require regular maintenance to effectively apply pressure (Khan et al 2014).

Lack of engagement with tools

Whilst Diofazi and Valko (2015) note that there is a lack of practical tools with respect to SPP, this study demonstrates that where these tools are present, that procurers are not adequately engaging with them. Table 6.8 displays extracts from GA interviews that reference different procurement tools.

Table 6.8. Engaging with tools

Tools	Illustration	Author's comments
All tools	*"We have been doing the basics, filling out the questionnaire but it's been a bit of a tick-box exercise done in isolation on a tender-by-tender basis." Procurement Officer A (Local Authority 1)* *"Tools often are used in insolation. More of a tick in the box for compliance." Procurement Officer B (Local Authority 3)* *"To be honest, people do them [complete the tools] because they want to do the job they're meant to. I'd be lying if I didn't say there was some lip service paid to it, a tick-box or doing it as basic as they can." Procurement Head B (NHS Wales)*	Disconnection. Training and integration needed. SRA standardisation. SRA as generic template.
SRA	*"We make use of all of them [procurement tools], it's part of the process that we follow. The SRA, to be honest, I don't think they [the team] like it very much. I think partly because of a lack of understanding of what it's meant to do or what it's for. Well, they say they've had training on how to use it, but I don't think they completely understand how to use it properly, and to be honest, neither do I. So, to get more out of it, I think we need a more in-depth understanding." Category Manager A (NHS Wales)* *"I don't fully understand how the SRA works. I get the basics. How it considers things like carbon I could not tell you. Often, we do the SRA so early on, we forget about it. Move on to the next stage, it's as if it sits on the completed tick-list should anyone ask." Procurement Officer A (Local Authority 1)*	Disconnection. Training and integration needed. SRA standardisation.
SQuID	*"the Squizzard tool, they [the team] find quite cumbersome... It's quite long, but it needs to be when it's a generic thing. So, they find it a bit awkward to use, but it just takes a bit more time than they'd like to spend on it." Category Manager A (NHS Wales).* *"The SQuID hasn't been updated for a while. We also need training on it. There isn't much around carbon. Of course, you can add your own additional questions, but being honest when I'm not confident in the area or using the tool I naturally don't go on to add additional questions." Procurement Officer B (Local Authority 3)*	Lack of training, length of tool, time available.
Community benefit tool	*"Community benefit tool is more for tender construction projects of £2 million and more. I think it's a good tool, but it is ever so long. Also, the construction focus doesn't help. I think we need one that's also for other products and services." Procurement Manager A (Local Authority 2)* *"I liked the idea of the community benefits tool as I think we do a lot of it anyway, but after I saw the tool it put me a bit off. Some of it is a bit of rocket science. Things, data I don't have available, or not sure where to get it from." Procurement Manager A (Local Authority 1)* *"We can help the community in different ways not just construction projects. The tool needs a relook at. It comes with good intentions." Food Procurement Specialist (NHS Wales)*	Length and depth of question. Skills and data issues. Construction focus. Need for a community benefit tool designed around goods and services

Table 6.8 presents a list of sustainability tools with extracts from participants. Though norm-based acceptance appears strong with procurers using the tools, they are being used as a *'Tick-box'* and in *'isolation'*, which were common terms used in reference to the tools. Aspects of training and understanding was also mentioned which will be discussed later in the chapter. Time available and the complexity of tools were also found to be hindrances. To appear legitimate to institutional pressures procurers are outwardly showing they are adhering. This is in accordance with the work of Oliver (1991), who notes the persistence of different covert resistance mechanisms to institutional pressure. Responses can vary from passive-active scales of resistance, including acquiescence, compromising, avoiding, defying, all the way through to manipulation. To give an explanation*, 'acquiescence'* strategy appears to be dominant theme in studies of institutional control (Hinings and Greenwood 1988; Tolbert and Zucker 1983). *'Compromise'*, *'avoid'* and *'defy'* are considered by Lawrence (2008). Finally, *'manipulate'* strategies have focused on institution agency (e.g. Maguire et al. 2004). What can be espied in the majority of the responses above is that some procurers are outwardly displaying their adherence, but are, in fact, resisting through '*ticking-the-box*', '*paying lip service'* or using it in '*isolation*'. This finding further adds to the work of Meehan et al. (2015) who reported *'symbolic tick-boxing'* and Preuss and Walker (2011) who report on *'tick-box culture'*. Meehan et al. (2015) explains that this strategy is used to protect individual positions and legitimise their decision-making. This in itself then becomes a barrier within the organisation. The findings thus lend support to DiMaggio and Power's (1983) argument about the iron-cage of homogeneity, by showing that this remains in organisations today. Consequently, on the surface there is a false-sense of acceptance and false-forms of homogeneity, whilst under the surface there is resistance at play. Duimering and Safayeni (1998) go as far to suggest that people become *'de-coupled'* from the institution, which moves further and further from their grasp. Oliver (1992) suggests that deinstitutionalisation of some organisational practices may occur as a result of internal political responses to shifting power, leader succession, dependency relationships or proportionate number of those who either oppose or support the status quo.

This study demonstrates that part of the reason why procurers may not be adhering to LCP is because barriers contained within the implementation of the tools. The extract below, however, highlights Policy Official B's (CPT, GB) attempts to rationalise the tools and emphasise the ease of use.

"The procurers just find it [using the SRA tool] too difficult. They think it's going to be too complex, they think it's going to be too intellectually demanding. It's not really. All you've got to do is bring it back to what do I need to ask when I tender? What do I need to think of when I'm putting my supply selection criteria together?"

Policy Official B

CPT (GB)

The findings from the CPT (GB) contradict those of their GA counterparts, some of which have displayed a strong degree of discontent towards the tools and have covertly resisted. There is no singular reason why GA participants are frustrated by these tools; rather, it appears to be an accumulation of different factors, including the tools composition, education, training and cultural shifts. Other difficulties with utilising the tools centre on them being time-consuming, which is exacerbated by additional issues of staff shortages and reduced budgets.

Tender evaluation and scoring process

The final stage in the procurement process involves the evaluation and scoring of the tender. The process is built to put regulatory and normative pressure on procurers, but the findings show that the regulatory pressure, in certain instances, creates barriers which reduce its effectiveness. As part of the process, the reviewer reviews each tender before allocating a contract. This process was recognised as a barrier by both groups. Table 6.9 provides two examples of this from the participant's accounts.

Table 6.9. Tender evaluation

Participant	Illustration
Category Manager A (NHS Wales, GB)	*'At times, price is worth 80% of a tender; for instance, sustainability is worth 20%, including LCP, so they [procurers] are obviously going to focus more on price during evaluation…'*
Policy Official A (CPT, GB)	*"When it comes to tender evaluations we're [the public sector] bloody rubbish, it works at the moment on the browse system, which doesn't make any sense to me. They [procurers] have what they call a technical envelope and the commercial envelope. The commercial envelope is just the price really! The technical envelope, which is the stuff that is scored on a quality basis, that's where sustainability sits, LCP fits. However, only if you pass a certain threshold they open the technical envelope, so, basically, it's focused around price... just looking at the price is not a suitable evaluation is it? The whole way tenders are evaluated needs to be rethought."*

Walker and Brammer (2009) reported that the procurement process is an enabler but did not reference the barriers within the process. However, Warner and Ryall's (2001) paper about implementation did report the scoring process as a barrier. Although this issue is not covered in more recent literature, this study demonstrates that the problem is still present. This study thus connects and adds to extent SPP literature by reporting that the evaluation scoring process is a far bigger problem than the literature would suggest. The participants in GA indicated that the overall tender evaluation process was geared around price, making much of the other considerations, including LCP, redundant, and, as such, presenting a barrier. The evaluation and scoring process is a major barrier because if a procurer follows the process correctly flawlessly and the *'envelope'* that looks at LCP simply isn't opened the whole process is redundant. Guenther et al. (2013) also reported that procurers felt their efforts were not useful. This study provides an indication as to where and why procurers feel their efforts were not useful and in vain. This poses a serious concern, because evaluation scoring process is dismissed, limiting the implementation of LCP as price invariably takes precedence, which suggests a cultural inertia to change from old traditions to LCP and other aspects of SPP. The final remark above made by the GB participant is indicative of the overall finding that many participants believe that a radical rethinking is required of the tender evaluation and scoring process in Wales.

Lack of policy training

Lack of policy training is another barrier raised by GA and the CPT participants (GB). Policy Official A (GB) stressed the importance of training:

> *"We always said there's no good just doing the policy, first you have to provide training and awareness to people [procurers] on the policy, and where possible then you got to provide them with tools. So we produced the sustainability risk assessment template, we produced the step-by-step guide to using the community benefits and produced the community benefits measurement tool. We produced the sustainable procurement assessment tool as well, which has now become the maturity model, so we built all those tools as we went along as well.*
>
> *Policy Official A*
>
> *CPT (GB)*

Policy Official A (CPT, GB) explained that training and resources were provided to Local Authorities, NHS and Further and Higher Education, which was confirmed by Policy Official B (CPT, GB). This is in accordance with Preuss (2011) and Preuss and Walker (2011) who also

reported a lack of training. This study extends this work by showing that there is a lack of specific policy training for LCP, which is urgently needed for instilling the requisite norms within an organisation, and, in turn, strengthening the institution. Scott (2014) explains that without adequate support weaknesses will begin to appear in the institution. Procurement Officer (Local Authority 1, GA) pointed out that training is no longer provided, as this has been scaled back. This corresponds with Policy Official A's (CPT, GB) account. Thus, the findings establish that the removal of training is a government policy decision, as the CPT participants acknowledge this, when emphasising that training budget cuts are a barrier to LCP. The impact of this is discussed by Category Manager A (NHS Wales, GA), who reported that procurers now find themselves navigating around a system full of documents, but with little understanding of their significance or purpose. Procurement Head B (NHS Wales, GB) elaborated further on the issues procurers face:

> *"I know there's guidance available on the website, but again it…it could be better if I'm being kind."*
>
> *Procurement Head B*
>
> *NHS Wales (GA)*

The findings thus illustrate that training and guidance are distinct and work best when training is provided alongside guidance material. At present, the failure to combine training with guidance constitutes a key barrier to LCP. This point was echoed by Policy Official B:

> *"I think people need to see a face, you need to have a conversation with somebody, rather than just reading something [guidance] and applying it."*
>
> *Policy Official B*
>
> *CPT (GB)*

Whereas earlier in the chapter it was noted policy was a driver for LCP. This study has outlined without policy training LCP is mitigated and therefore presents as a barrier. Without this in place resistance in different forms may appear (Oliver 1991).

Lack of communication

Category Manager A (NHS Wales) and Procurement Manager B (Higher Education 1) from GA explained that systems were *'one-sided'* and *'top-down'* as there was no feedback to

explain what was happening within their procurement roles. This coincides with the account of the Food Procurement Specialist (NHS Wales, GB).

> *"There is a level of tension of saying things don't work as a conversation. Communication is very much one-way, there is an assumption that things will just work out if they tell us to follow such sustainable public procurement policy statements. We need to be real about it all, and the honest truth is that it doesn't always sit well."*
>
> *Food Procurement Specialist*
>
> *NHS Wales (GA)*

This narrative recurred across the different public sector organisations, and was directed at the government and, more specifically, the CPT.

Diary: One-way communication

September 2016

There is friction between procurers and policy officials. Procurers do not seem happy with those above them and feel subservient to the constant demands. Policy officials feel procurers are not working effectively. There is tension in the air which I can sense, and bridges need to be built to achieve harmony which appears lost.

As aforementioned in this chapter, little exists in extent literature around the role of policy teams within the field of SPP and LCP. During the interview with the GA Participant (Food Procurement Specialist) the tone of the conversation changed, and frustration was vented when discussing this lack of communication. Policy Official A (CPT, GB) explained that there was a reduction in resources due to restructuring and the movement of staff from CPT to a new public buying organisation, without replacing them. This staff shortage has negatively impacted on the CPT. Drawing inferences between the interviews and research diary entries, it appears that part of the reason as to why there have been changes in CPT is underpinned due to the stigma attached to the CPTs, directing, ordering procurers. These findings correlate with lack of government leadership which is recognised on the Macro level as a barrier which then leads to lack of communication which is a Meso level barrier. Essentially, these findings conclude that collaboration, engagement and communication are Meso level enablers when done well and perceived as Meso level barriers when done poorly.

6.9.2 Regulatory

Organisational leadership

Extant SPP literature has identified *'Top management support'* as a facilitator of implementation of SPP (Brammer and Walker 2011; Walker and Brammer 2009). However, both Bratt et al. (2013) and Meehan and Bryde (2009) explain that a barrier occurs in situations in which such support is not provided. Specifically, this research found that both groups interviewed considered lack of organisational leadership within public organisations as a key barrier to LCP. Upon reviewing the participants' narratives, senior management at Meso level were not entirely blamed, but, rather, considered to be providing adequate leadership under the current circumstances of budget cuts, resource strains, and lack of direction from senior government leaders. This study thus highlights the important connection between organisational leadership and governmental leadership. Senior/Top managers in public organisations are in effect institutional regulatory agents and operate as carriers of pressure from the government (Scott 2014). Consequently, there is a connection here between Macro and Meso forms of leadership, which draws attention to the importance of leadership in promoting LCP. For example, Category Manager C (NHS Wales, GA), in addition to complimenting a specific director, also explicitly referenced the significant pressure that they were under from government.

6.9.3 Cognitive

Culture

Preuss (2009) and Preuss and Walker (2011) report *'organisational culture'* as a barrier. This study connects and adds to explains that there are different cultures within an organisation. GA participants including Procurement Officer C (Local Authority 3), Procurement Officer B (Local Authority 2) and Procurement Officer A (Local Authority 1) explained that the culture varies significantly across an organisation, which also presents a barrier. There is a department/unit culture, section culture, and organisational level culture. Achieving a culture shift is thus not straightforward due to the resistance to change faced. Procurement Head A, from NHS Wales (GA), an organisation which was earlier complimented, explains the challenges that the NHS Wales has faced.

> *"having to think about it [low carbon], build it into business as normal and get people to culturally deal with it, in itself is a bit of a challenge."*
>
> *Procurement Head A*
>
> *NHS Wales (GA)*

This extract reflects the difficulties in implementing a cultural shift across an organisation. However, the NHS Wales has shown that a cultural shift is achievable. Procurement Head B notes:

> *"In terms of culture, I'm confident in saying the vast majority of staff [central procurement] are on-board [LCP]. Again, there is resistance to change, but in central sourcing [department], you know we've got a much younger staff profile coming through. As it happens we've had a lot of staff that are coming up to retirement age. So, we have got sort of a lot of younger people coming through now, and it is conducive to the appreciation of this agenda really."*
>
> *Procurement Head B*
>
> *NHS Wales (GA)*

Overall, the data on culture suggests that a culture shift is achievable, especially amongst younger staff who are more agreeable and adaptable to the LCP agenda, viewing it as acceptable practice (Khan et al. 2014). Some participants from GA however noted that they were ridiculed for being proactive in LCP, with phrases such as *'tree-hugging brigade'* and *'do-gooders'* being hurled at them, which suggests that there is discontent and not everyone is pro-LCP. Further research could contribute to this area by examining the difference in cultures within and across the procurement function.

6.9.4 Other

This sector is called 'Other' and outlines findings obtained abductively which fall outside IT. This section starts with resources which was a dominant theme for barriers.

Resources

Resources were identified as a key barrier to LCP. Barney (2001 p. 101) defines firm resources as: *"all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc."* Hence, resources can be both tangible and intangible. Adriessen (2004) explains that tangible resources include physical assets such as financial resources and

human resources, including properties, raw materials machinery, plant, inventory, cash, and so on. Whilst Lev (2001) posits that intangible resources may be embedded in organisational routines or practices, such as an organisation's reputation, culture, knowledge or skills (know-how), accumulated experience, relationships with customers, suppliers or other key stakeholders. The following resource barriers were identified in this study: budgets; human resources; knowledge and skills. However, resources are not covered in the primary lens (i.e. Institutional theory) adopted for this research. Resource-Based View (RBV) is an approach, which attempts to achieve a competitive advantage through utilising valuable resources (Wernerfelt 1984; Barney 1991) and provided an additional lens for the research. These resources can be exploited by the firm to achieve a sustainable competitive advantage. RBV suggests that a firm should focus on its resource strength, rather than environmental opportunities and threats. This research has demonstrated that, due to constraints, organisations have not been able to exploit resources to effectively implement LCP. This represents a key finding, because thus far RBV has only been used once in the SPP literature by Meehan et al. (2017), who explained that examining the resources of an organisation can provide an effective avenue through which to understand why barriers or enablers may be present. Resource is a barrier to institutional logic being achieved. By exploring RBV in this research, it was thus possible to distinguish between tangible and intangible resources. Budgets, which constitute one of these tangible resources, will be discussed first.

Budgets

Public sector austerity is identified by both groups as a barrier at the Macro level, which subsequently impacts upon departments and their budgets at the Meso level. Phrases used in both groups included *'savings'* and *'do more with less'*. Previous studies have touched on budget being a barrier (Geng and Deberstein 2008; Preuss and Walker 2011). This study confirms and adds that it is not only budgets but the *'budget cuts'* experienced in the public sector affecting LCP. The research confirms that budget cuts have left organisations with less staff, which has resulted in de-skilling and less time to respond to the WPP. All four industrial sectors within GA (Local Authorities; Higher Education; Heritage Wales; and NHS Wales) mentioned budget cuts. Higher Education and Heritage Wales participants appear less affected by budget cuts. This can be explained as Higher Education is not fully depending on government funding and Heritage Wales has a relatively small budget overall compared to the others and has not been targeted with budget cuts. Budget cuts have resulted in a shift in thinking towards the short term as explained by Policy Official B (CPT, GB):

> *"Procurers are now slowly coming back to the core activities of procurement, tendering, making sure things are complying, making sure things are on time and achieving more of a commercial focus rather than thinking what are the wider benefits of this money that we spend like LCP as we are in a period of austerity. They don't have the budget anymore."*
>
> *Policy Official B*
>
> *CPT (GB)*

Budgets thus clearly have a significant impact on LCP, which can undermine the WAG policies, legislation and initiatives aimed towards facilitating LCP and present a situation of resistance as resource cannot be capitalised upon (Barney 1991). This resistance can vary (Oliver 1991; 1992). The reason for the resistance is because they cannot accommodate nor implement LCP initiatives using their budget.

Human resources

Human resources are recognised as a barrier at the Meso level. This study adds to the work of Kordestani et al. (2017) by demonstrating a correlation between budget cuts and reduced human resources. The participants from NHS Wales (GA) reported that there was no loss of staff in their procurement teams affecting LCP, whereas LAs were heavily affected by budget cuts. Participants from Local Authority (GA) all referred to budget cuts and loss of staff. Procurement Officer C (Local Authority 3, GB) explained that they lost a sustainability officer who would have supported them in procurement. The Procurement Officer A (Local Authority 1, GA) reported that the LA were reducing the numbers in procurement teams resulting in a £300,000 saving (equivalent to losing 12 full-time staff). This account is echoed by Policymaker B (Welsh Government) and Programme Manager (Support Organisation 2) in GB. The procurement teams in the Local Authority claim that where staff numbers are replenished, it is in the form of temporary or lower skills employees. Additionally, participants from the Local Authorities explained that CPT previously supported the sector by arranging *'Meet the Buyers'* events. This funding has been removed from the CPT and therefore unable to support the Local Authority. This has led to further strain on local authorities now who are now arranging and funding *'Meet the Buyers'* events, costing thousands of pounds per event. It appears that Local Authorities struggling with human resource to facilitate LCP. Additionally, staff shortages have a direct correlation with time. Participants from GA mentioned *'lost time'*, *'not enough time'*, and *'time is of the essence'*.

These accounts featured more in Local Authority participants' interviews compared to other groups, which mirrors the significant procurement budget cuts they faced. More specifically, LA participants explained that they have not been able to utilise the tools fully due to time constraints. These findings demonstrate the ways in which financial cuts negate the potential to progress towards LCP.

Knowledge

Lack of knowledge of LCP featured as a key barrier to its implementation in the GA interviews. While not often discussed specifically in the literature Zhu et al (2013) did report lack of knowledge. LCP is perceived to be a complex topic by procurers (GA) due to its complicated terminology. The levels of knowledge and understanding varied across the GA group. The Procurement specialist (Heritage Wales, GA) explained the difficulties faced:

> *"All they [the procurement team] had done was cut and pasted from the other documents and there was no coherence, no coherent pattern, the whole thing was a complete mess. But the point is, they put major documents for companies to respond to offers and if you don't have a coherent argument going to the market with telling the market what you want; counter benefits, waste disposal, then you have no chance of getting decent bids back. In food, there is waste of pathogen, food chucked at the end of the process, perishability issues..."*
>
> *Procurement Specialist*
>
> *Heritage Wales (GB)*

This extract draws attention to the difficulties faced by procurers when having to embed LCP within their practice. Language was repeatedly recognised as a barrier in the interviews, and there are currently ongoing strategies to address this by re-phrasing carbon reduction and/or LCP as resource efficiency. Correia et al. (2013) explains LCP specifically requires specific technical knowledge and skills. This study supports and adds to Correia et al.'s (2013) view to outline the barriers faced in terms of knowledge. Procurer (GA) predominately associated carbon with vehicle carbon emissions. GA participants routinely made reference to reducing carbon through transport vehicles.

"Most people's [procurers] understanding around LCP, if present, is around transport."

Food Procurement Specialist

NHS Wales (GA)

The Food Procurement Specialist went onto state that carbon considerations in food transportation were considered more extensively than the actual food being procured. GA participants repeatedly make reference to *'delivery miles'* and *'reducing carbon emissions'*, which suggests that procurers are not adopting a holistic approach to carbon, but, rather, focusing on specific aspects i.e. vehicular carbon emissions. Troublingly, whilst the findings indicate that procurers believe that local suppliers' equal lower carbon, in fact this logic is not consistent with a life-cycle approach which, in certain cases, can result in locally supplied goods actually being less carbon efficient than goods shipped from overseas. For example, Clover (2015) explains that there is, in fact, less carbon involved in importing tomatoes from Spain than growing them in the UK, which illustrates that delivery miles are not always the main contributing factor to LCP. Consequently, rather than focusing on delivery miles, as was reported by one of the participants, the focus moving forward should be on the entire life-cycle of a product or service. There was a clear indication in the data that senior procurers, such as Procurement Manager C (Higher Education, GA) have a detailed understanding of LCP whereas other procurers lacked this expertise.

<u>Skills</u>

Skills that operate as a barrier on the Meso level are to be distinguished from knowledge insofar that skill represents the ability to understand, enact and apply LCP. With regards to this, both groups identified a skills-deficit in public procurement. Policymaker A (WAG, GA) and Policy Official A (CPT, GB) discussed the skills barrier in procurement.

"I would say that procurement is quite a specialism, and people [procurers] don't generally understand that, let alone LCP. So, again, there I think there's scope to help people understand it more, what opportunities there are for them to build that into specifications of the procurement processes themselves that then feeds through into what delivery is actually taking place."

Policymaker A

Welsh Government (GA)

"Skills, skills and skills are a barrier in the public sector. We haven't got enough procurement skills. We haven't got enough LCP skills"

Policy Official A

CPT (GB)

This is consistent with the work of Akenroye (2013) and Sporrong and Brochner (2009), who also reported a skills barrier. This study confirms their findings and adds to them by specifically explaining the level of barrier it is. Although there is a dearth of literature on skills, Correia et al. (2013) explain that for LCP to operate there is an urgent need for specific LCP skills. Entries in the author's research diary made during observations and discussions at procurement events indicate that the sector's lack of skills is a major barrier. Moreover, this was a recurrent theme in the interviews. NHS Wales (GA) encourages and supports staff to obtain chartered certification in procurement, as explained by Category Manager A (NHS Wales, GA), which could be viewed as norm-based influence. Findings from NHS Wales participants confirm that, historically, the NHS Wales funded staff to obtain degrees and other qualifications to ensure that they had the requisite skills for their respective roles. Policy Official A, further explained this skill shortage:

"People [procurers] are moving more towards thinking about whole life costs and balances, but I think there's a massive skills deficit there, people don't know how to do it. And even the people you expect to know it, like, the <name omitted> for instance they don't. We were meeting the <organisation name omitted>, some finance people, and looking at the total cost, and the representative from <organisation name omitted> basically said that they didn't know how to do it. They're the experts, they're supposed to know how to do it."

Policy Official A

CPT (GB)

The above extract addresses the technical skills-gap in Wales, which includes LCP. However, this also connects to the work of Correia et al. (2013) who outlines the need for specific LCP skills needed to operationalise LCP. At the time of making this comment, Policy Official A, vented frustration at procurers for their lack of skills, noting that there was a level of expectancy that professionals should be familiar with LCP. There was a recurring theme of discontent expressed by some GB participants towards procurers (GA). The skills barrier was

reported across the public sector. The findings outline many GA participants were unfamiliar with the whole life-cycle costing linked to LCP, which would be referred to as technical LCP skills (Correia et al. 2013), whilst many associated the skills-deficit with austerity and the attendant reduction in support and training. With the procurement function being undermined by knowledge and skills barriers, it would appear that they are unable to operationalise LCP to its full potential due to this resource barriers, which, in turn, hampers the overall process of implementing LCP.

Uncertainty

Sustainability aspects

Participants in GA reported conflict during the implementing of the procurement process. Category Manager B (NHS Wales, GA) provides an example whereby his procurement decisions would be resource efficient and thus immediately reduce carbon. However, the consequence of this would be to lose a supplier, which would impact upon the supplier's workforce and also the local economy, possibly costing the taxpayer more overall if unemployment needed to be subsidised via the welfare state. Category Manager A (NHS Wales, GA) faced similar dilemmas. Consequently, the participants often felt confused in their decision-making and stressed the need for governmental leadership to provide direction on how to deal with such situations, which frequently occur. Walker and Brammer's (2009) UK survey, and Brammer and Walker's (2011) international comparison survey touched upon this conflict between environmental and social factors. This study adds to this literature by underscoring that conflict is part of day-to-day life within procurement. This finding connects with Correia et al. (2013), who note that LCP procurers often have to deal with multiple trade-offs between different aspects of sustainability. Unfortunately, this problem is not a new one, and, moreover, there is no straightforward answer to this kind of situation that Rittel and Webber (1973) refer to as a *'wicked problem'*. Rittel and Webber (1973) in their publication titled *'Dilemmas in a general theory of planning'* stress that in certain types of situation there can become an inherent practical issue where there are complex organisational or political priorities which have no clear solutions. Such factors must be taken into consideration by policymakers. Where such conflicts occur and are not resolved, these should be guided by policymakers and senior leaders. Without guidance in these matters, this could lead to *'covert resistance'* or even *'de-coupling'* from the institution (Duimering and Safayeni 1998).

Specialised purchases

This study adds to the literature by outlining the lack of process for specialised purchases. GA participants explained that the public sector periodically makes specialised and unique purchases and that there is currently a lack of strategy about how to manage such procurement activities. One example cited by the Procurement Specialist (Heritage Wales, GA) involved the purchasing of slate roofing for a castle renovation which was rare and specific to the need. Category Manager B (NHS Wales, GA) also outlined how specific surgical equipment was purchased primarily from Germany and Pakistan due to supplier availability and one surgeon's preferences, which caused conflict with procurement tools', processes and LCP strategies since the end-users were adamant that specific items be purchased regardless of LCP, and partly because there were limited suppliers offering the products. This illustrates that in a practical situation LCP is simply not always achievable by procurers. As such, this highlights the weakness in current regulatory and normative pressures and suggests that they are not fit for specialist purchases, which is causing conflict.

Uncertainty to act

Participants from GA claimed that economic and political uncertainty often served as a barrier to LCP, as procurers felt that more pressing issues like securing their own job or saving departmental funds took precedence in such a climate. To provide more context, this research was conducted during the time of the UK referendum on leaving the European Union (Brexit) and in its aftermath, as well as during a period of continued austerity following the global economic collapse in 2007/8, which culminated in a period of austerity and instability within the public sector. This uncertainty has led to a reluctance to fully embrace LCP, which constitutes a barrier to its implementation. IT would suggest in periods of uncertainty mimetic behaviour takes place, this research has identified that mimetic behaviour is indeed taking place, however, in the form of resistance, to adhere to LCP initiatives which are compromised due to tools, budgets cuts, austerity, skills shortage, manpower and lack of alignment to name a few of the hurdles faced by procurers. Although Walker and Brammer (2009: 135) reported a *'lack of pressure to act'* as a barrier, it was considered in their survey as a minor barrier. This study extended this discussion to show that, since their publication, further economic crises and instability within the sector has led to procurers becoming hesitant about taking action. This study thus demonstrates that, at this historical juncture, there are major issues undermining the sector's ability to act, such as Brexit and an unstable government. Whilst IT focuses on legitimacy, this study has demonstrated where is instability is present, legitimacy is not being achieved. This is perhaps

because during unstable periods people are not held accountable for their decisions in the same way, as institutional pressures have been weakened (Scott 2014).

Cost/Price

A major barrier mentioned by participants in both groups was cost. GA participants raised the issue of cost more than their GB counterparts, which is perhaps to be expected given that they procure daily and have a greater understanding of the implications of cost. The terms *'cost'* and *'price'* were repeatedly used, but for ease of reference the term *'cost'* will be used to cover both. Cost is not covered within IT but appears as a major barrier in this research. Cost has been discussed by several authors in the field, including Aldenius and Khan (2017), Brammer and Walker (2011), Correia et al. (2013), Kordestani et al. (2017), McMurray et al. (2014), Walker and Brammer (2009), and Warner and Ryall (2001), however their research does not give a full explanation of the cost barriers faced. However, Meehan and Bryde (2009; 2011), did identify cost as a barrier, specifically in terms of *'cost savings'*. This study adds to this body of literature by providing a breakdown of how cost appears as a barrier. Cost in this context differs from austerity measures and has been divided into sub-categories in Table 6.10.

Table 6.10 Cost breakdown and its effect on Resources

Cost Category	Illustrations	Resource Base	Focus (Cause)
Perceived cost	*"The perception is that a product which also delivers low carbon also comes with a price tag. They are seen to be more expensive"* *"Sustainable and low carbon products give off that perception they cost more. It's as if you have to pay more to have this unique feature."*	Capability	Knowledge/ understanding
Cost against budget	*"I think people will enact in ways that meet the needs of whatever they're being measured against, and at the moment its working with low budgets, so they are working within and against the budget."* *"A big constraint here is the focus on 'saving', how much can be saved, it's a short- term focus in procurement."*	Capacity	Budget barrier
Carbon against non-carbon feature product price	*"low carbon feature products have always been more expensive against the standard products"* *"In tenders I have completed the low carbon option hasn't had a chance compared to the average run-of-the-mill product."*	Capacity & Capability	Scope to explore long-term benefits and explore value for money

Up-front costs against long-term benefits	*"If I say in 10 years, you're going to save £60,000 with this low carbon project, but this year you have to spend £100,000 we're not getting permission to do that because there's nothing in the budgets."* *"Sometimes the low carbon option involves long-term savings but short-term upfront costs. However, we are not geared for that, we want to look at costs short-term. Who knows what will happen in 15 years' time."*	Capacity & Capability	Scope for whole life costing.

The breakdown of cost in this format provides a greater level of understanding of costs. Table 6.8 outlines that cost is connected to resources from a *'capacity'* and *'capability'* perspective. Capacity may be an area unable to be addressed through this study as it is connected to actual budgets. However, capability is an area where a contribution can be made towards change. This is because, intervention, providing adequate training and support may be able to help to improve capability. This is an area worth reflecting on for further cycles of inquiry.

Silo behaviour

Silo behaviour was also deemed to be a barrier by both groups. Although extent SPP literature points towards decentralised procurement (McMurray 2014; Preuss 2011), this study stresses that, at times, it is not only about decentralised procurement activity, but, rather, about realigning the structure to mitigate the forms of silo behaviour that can inevitably be in operation within such a large sector. This connects to the barrier of a lack of alignment on the Macro level. Although regulatory and normative pressure are being spread, this study shows that silo behaviour nevertheless appears to still be in operation, which is not covered in extant SPP literature. Silo behaviour is split into two parts: silo budgets and silo activity.

<u>Silo budgets</u>

At present, procurers (GA) report that their organisations' fragmented budgets serve as a barrier, a finding which coincides with lack of alignment. Teams and departments within NHS Wales may also have distinct budgets, which once again presents a barrier to LCP, as the food procurement budget and the waste disposal budget are not linked, meaning that the cost of disposing food waste is not direct considered when procuring the food items. Adopting a whole life approach requires looking at budget structures in organisations to review how they can be used to effectively implement LCP. It is important to note that progress is being made on this front; for example, the NHS Wales has recently been attempting to bring teams

together to iron out the kinds of issues discussed above pertaining to disparate budgets within an organisation.

Silo working

Silo working was identified as a barrier by both groups. Procurement Officer C (Local Authority 3, GA) provides an example:

> *"We [the Local Authority] have project managers who don't actually have procurement experience, but they still have a budget to spend and engage with suppliers, so they do that. LCP and other SPP areas are not considered here."*
>
> *Procurement Officer*
>
> *Local Authority 3*

It is apparent from the above extract that, when considered alongside lack of alignment and lack of communication/collaboration, silo working cumulatively creates a barrier which has yet to be remedied. This fact is recognised by a Senior Executive (National Procurement Service, GA) who states:

> *"A barrier faced is around a few different teams going off and following their own particular activity. There still is and always will be a degree of silo working and it's not deliberate."*
>
> *Senior Executive*
>
> *National Procurement Service (GA)*

Given the large scale of the NHS Wales and other public sector bodies, it is expected that elements of silo behaviour will exist. As such, findings from both groups do suggest that silo working is a common occurrence in the public sector, but this does not appear in SPP literature. Leiren and Jacobsen (2018) from the wider literature recognise silos as barriers to public sector adaptation to climate change. Three participants from GB provide an example of a large-scale transport project in South Wales, valued at several billions of pounds, being planned without LCP considerations at the outset. Fortunately, following intervention from WAG there was an opportunity to conduct a landscape review to retroactively instil LCP. This example is one of many that resonated with the participants, who felt that greater alignment was required to reduce silo working.

6.10 Micro Barriers

6.10.1 Cognitive

Lack of awareness

The narrative put forward by GA participants is that procurers are unaware of the wider legislation driving the LCP agenda. McMurray et al. (2014) and Walker and Brammer (2009) also identified lack of awareness of policy as a barrier. This study extends this work which showed that a lack of awareness of law and policy, by explaining why there is a lack of awareness. Specifically, some GA participants noted that they were not aware of the wording of the WPP and others did not associate it with sustainability, but, rather, identified it as a procurement policy. Procurers appeared to be more familiar with procurement legislation than they are with sustainability driven legislation and the compatibility between the two. This represents a knowledge gap which needs to be addressed.

The key narrative emerging out of the interviews with GA was that many procurers were unaware of the resources available from support organisations. Category Manager A (NHS Wales, GA) noted that this is due, in part, to the lack of promotion. Whereas Walker and Brammer (2009) note *'awareness'* as a barrier. This study explains procurer's awareness is also connected to promotion or lack thereof. The NHS Wales and Local Authority participants were more familiar with support organisations than others, because the government had previously promoted direct collaboration with support organisations. One notable finding was that a training organisation tasked with instilling sustainability training across the public sector was only identified by one GA participant. In the interview with Policymaker A (Welsh Government, GA), they explained that funding has now been withdrawn from that organisation as they were not delivering what was expected of them. Drawing inferences from these two accounts, it appears that part of this lack of awareness can be related to the promotion and delivery from WAG. Hence, although support organisations are recognised as a Micro level enabler, some support organisations are far less known than others. Moreover, recent cuts and changes have reduced support organisations resources, which acts as a barrier to LCP.

Lack of motivation

Previously, it was reported that individual motivation and institutional entrepreneurship supported the implementation process of LCP. The participants in GA, however, reported a lack of motivation in pursuing LCP. This is in accordance with Preuss and Walker (2011) and

Walker and Brammer (2009), who also reported a lack of motivation. In this study, a lack of motivation related to organisations experiencing budget cuts and a reduction in resources. These findings indicate that the lack of motivation is thus a symptom of cumulative barriers. This line of argument is supported by Procurement Officer B.

> *"I'll be honest, I like the whole topic and think there's a lot to achieve here. However, we are faced with cutbacks, loss in numbers in the team. I'm feeling the pressure of it. I haven't got the motivation to fight through it all….it is a bit demoralising so to speak."*
>
> *Procurement Officer B*
>
> *Local Authority 2 (GA)*

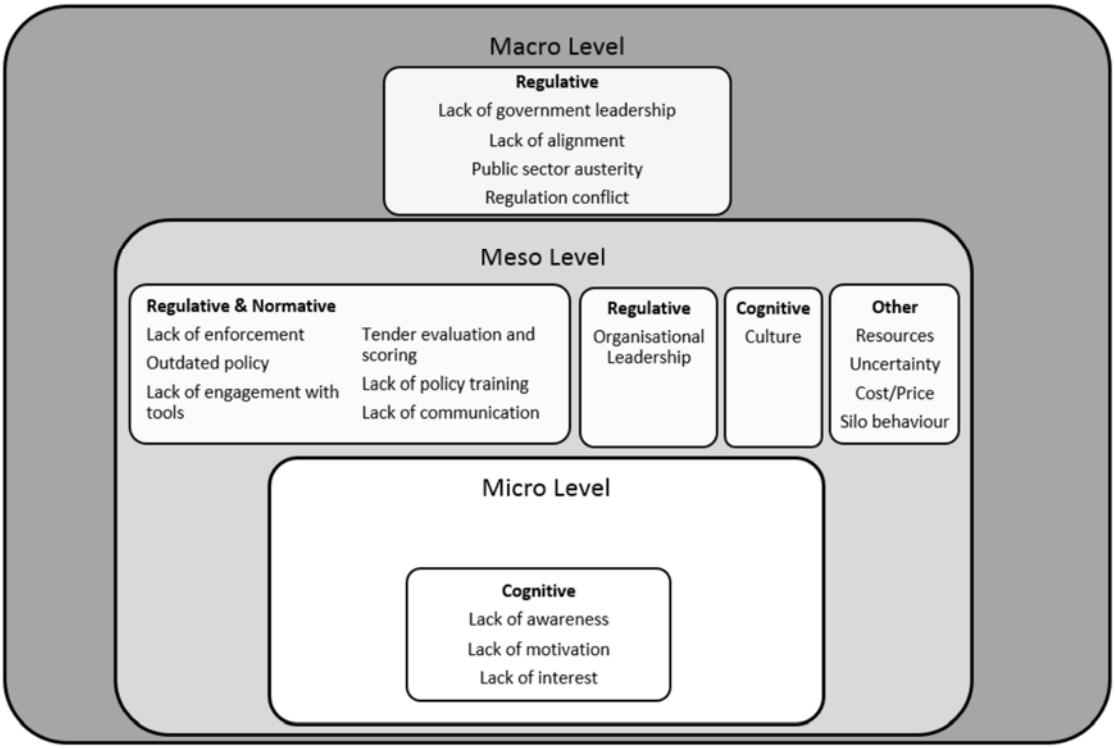
Consequently, the symptoms of austerity appear to have permeated the Meso and Micro levels, in turn, lowering the motivation of individuals leading to resistance at Meso level (Oliver 1991). It is unclear whether the reversal of austerity measures will have the opposite effect of improving motivation, which presents scope for future research.

Lack of interest

Although there was a range of views towards LCP in GA, one theme that emerged was that there were members of the procurement team (GA) that had a lack of interest towards LCP. This was not indicative of the entire group. This lack of interest differed between procurers within the public sector by age. The research found that younger procurers were invariably more interested than their older counterparts. Furthermore, the findings also demonstrate that there were negative comments made to those staff embracing LCP, who were branded as *'the tree hugging brigade'* and *'do-gooders'*. This lack of interest in LCP, by some, points towards weak cognitive pressures on procurers (Scott 1991). It is necessary to understand the sector has moved in the last decade to implement LCP and seek clarification why some procurers may have resisted these changes.

To conclude this section a conceptual model has been created encapsulating the major barriers for LCP within three pillars of IT as well as identifying the outliers. This model presents barriers over three levels Macro, Meso and Micro in Figure 6.3. Next, RQ3 will be answered and then the section concludes with additional commentary from participants.

Figure 6.3. Barrier Model



RQ3: What are the major barriers and enablers of LCP within the public sector, and how do they operate and interact?

The major barriers and enablers of LCP are covered in turn in the body of this chapter. Two separate models are compiled to succinctly present the key themes and concepts extracted from the dataset: Figure 6.2 presents all the major enablers of LCP, whereas Figure 6.3 (above) presents all the major barriers. The themes and concepts are presented over three levels. Overall, the findings indicate how IT is an expedient lens through which to observe the major enablers, which are then split into regulatory, normative and cognitive pillars. IT was equally a suitable lens to frame all the major drivers, however, findings illustrated that IT alone is not enough to investigate all major the barriers of LCP. Emergent from the research, through a process of abduction, were other factors including a resource-based perspective, due to the fact that many resource-based issues were reported as barriers.

Throughout the chapter the interconnectivity between the different levels and how themes and concepts interact are presented. The findings between the two sample Groups identified similarities and differences, with no specific pattern, which was expected given one consisted

of procurers and the other of policymakers and support organisations. Overall, more barriers were identified than enablers and there was no universal answer to what may enable or prevent LCP. Having extrapolated the data into conceptual models and presented data in tables it is clear LCP is inextricably intertwined and complex. Examining barriers and enablers also helped to identify *'causes'* and *'symptoms'*, such as lack of alignment leaving procurers in situations of conflict. Emerging from the data was that '*institutional entrepreneurship*' little discussed in extent literature, was identified as a Micro level enabler as well being a Micro level driver. A key finding about the barriers and enablers of LCP are that many appear as two sides of the same coin. A prime example being 'alignment' which is recognised as a Macro level enabler whereas the 'lack of alignment' is perceived as a Macro level barrier. Similarly, '*passion*' and '*contribution*' were deemed Micro level enablers whereas '*lack of interest*' and '*lack of motivation'* presented as Micro level barriers. Furthermore, it is recognised that certain themes and concepts permeate through the levels (e.g. *'austerity'* on Macro level, *'resource'* barriers identified on Meso level, and *'lack of motivation'* on Micro level). Finally, resources barriers appeared strongly in the findings. To close this section, additional participant extracts are presented in Table 6.11. The next section of this chapter provides an integrated model along with detailed scenarios outlining how drivers, barriers and enablers operate on different levels and interact.

Table 6.11. Summary of Barriers

Levels	Concept/Theme	Sub-theme/ concept	Group	Examples/illustrations
Macro	Lack of government leadership		A&B	*“They [procurers] need to be led by the government. Leading by example and they're not doing that at the moment in my opinion.”* *"Pressure and direction are needed from above, right from the top, at a government level. However, we are not seeing it and people are not feeling it."*
	Lack of alignment		B	*"One of the key messages that I’m kind of putting out at the moment is that we need to align ourselves more and it’s a bit frustrating that not all the parts of this organisation are wholly aligned."* *"I admit there has been a lack of alignment at times in Wales. Sometimes the left hand doesn't know what the right is doing. In such a big sector there is so much going on. So many organisations and people feeding it and it times it can get a bit fuzzy."*
	Conflict: Procurement directives VS sustainability laws and policy		A&B	*"The difficulty comes in the practice sometimes. One of my big gripes with the things that come out of government is that policy guidance isn’t always in tandem with what the legislation is. So, one of the big ones is local sourcing, sourcing things as locally as we can. Well, you know, I’m completely on board with that, my accent probably gives me away, but I’m a proud Welshman.... procurement legislation dictates that we can’t give any preference due to geography."* *"Automatically here, there’s a conflict between policy and legislation, and legislation is going to win unfortunately. That’s not to be disingenuous as a lot of the stuff in terms of community benefits, is really positive in terms of the Welsh government.”*
	Public sector austerity		A&B	*"Austerity, austerity and austerity is holding us back to implement..."* *"Whether that [lowering carbon] becomes deliverable is down to austerity. Some of these plans have changed over the last couple of years because of the austerity issue "* *"We are in a period of austerity should I say. This naturally will have a negative impact, it is a barrier to implementation..."*
Meso	Lack of policy enforcement		A&B	*"It’s a bit of a mixed bag. Some people add it into the procurement desk instructions, procurement manuals but it’s not really enforced...You know they may have used it, but…"*
	Outdated policy		A	*"We are still following an outdated policy and definition from 2006. Things have changed, we are a decade on, the full policy hasn't had a refresh. The world is revolving every day. Sustainability and aspects such as the carbon agenda have evolved and so should the policy."*

	Lack of engagement with tools		A	*"Quite often the outcomes of the tool aren't followed through into the specification. Procurement is a bit more complex. The SRA is completed at times early on and then when the tender is put together the SRA is put aside for a number of reasons…."* *See main body for more.*
	Tender evaluation and scoring process		A&B	See main body.
	Lack of policy training		A&B	*"It's easy for them to say we can't do our job, we don't know how to. But being realistic, we don't get the training on it. I've been here a while and I haven't got the training to adhere to the procurement policy. We are thrown a few tools and off you go."*
	Lack of communication		A	*"There isn't really a clear feedback loop, it is all very much top down. Follow the policy and rules. At times you can feel a bit disconnected from the agenda."*
	Organisational leadership.		A&B	*"When taking a view of leadership, there is a need to look at organisational level leaders. This in the public sector at times is a reflection or at least a link to the direction they have been given from governmental leaders. There's a connection between the two. At the moment, at both levels it is a barrier. I'm not saying my director isn't doing his job because he's doing the best he can under the given situation. Our organisation levels need to be directed and supported right from the top in government."*
	Culture		A	*"The culture of local authorities varies a lot. We are fairly proactive in our department. We do what we can. But we are just one unit, literally a unit. Other departments do not share the same culture as us in the local authority. Think about it, we have thousands of employees and so many departments. People come and go. The narrative varies a lot."*
	Resource base	Budgets	A&B	*"I think the key challenge is with budgets being squeezed across the public sector, and sometimes you do have to invest to save, don't you?"* *"Now budgets are cut so much, there may not be a lot of savings left to be achieved."* *"Whenever you've got budget pressures there's less time to focus on other things like reducing carbon "* *"Budget reductions are a specific challenge in procurement right the way across government to the delivery of sustainability and LCP."*
		Human resources	A	*"Our Local Authority has target savings of £300k to be made directly through the procurement function. This is equivalent to 12 full time staff. Delivering aspects of sustainability such as low carbon through procurement isn't easy under such strain."* (LA)

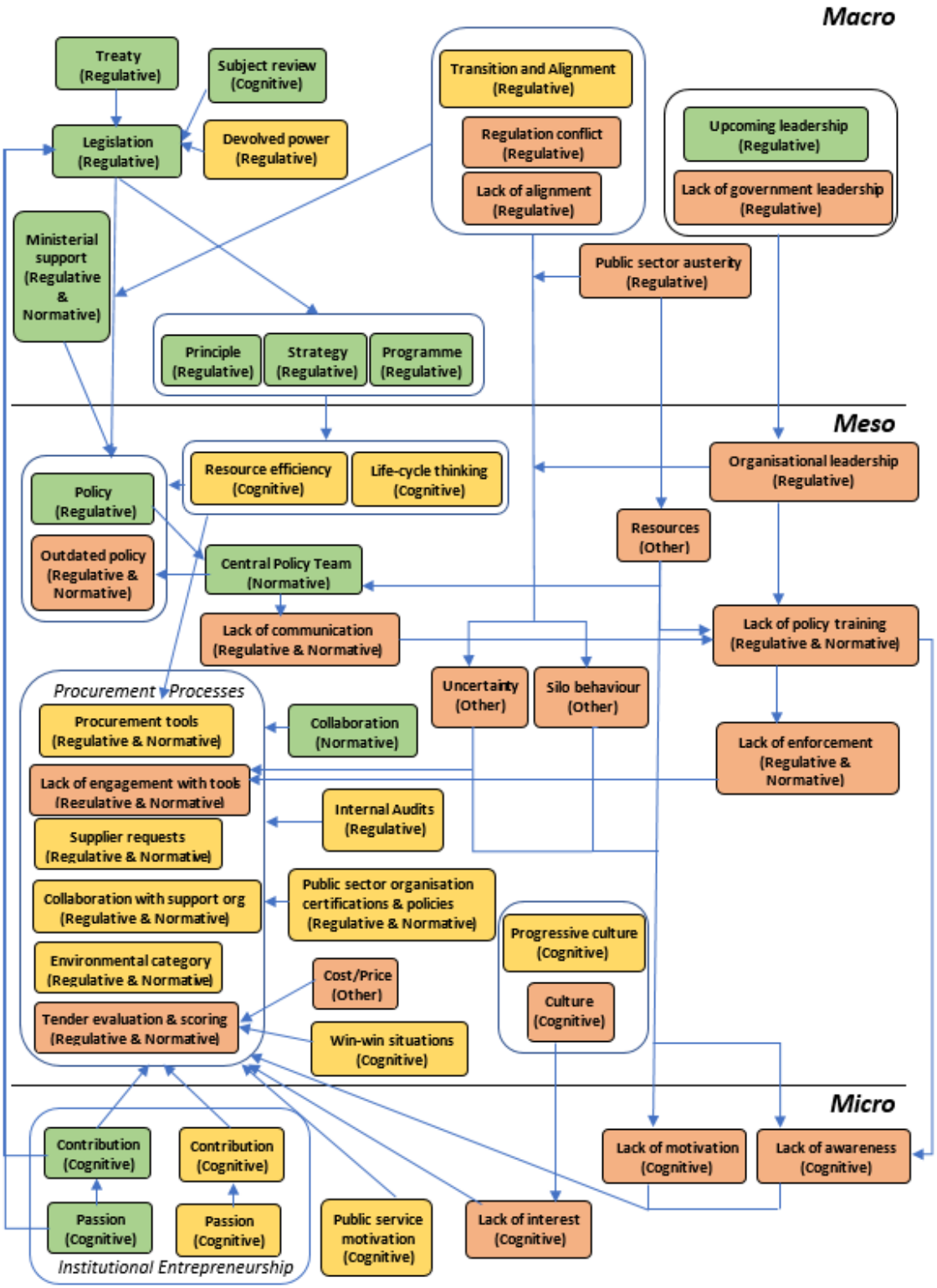
		Awareness	A	*We don't even know about legislation in the area of carbon and procurement. I'm sure there is legislation, but we have little knowledge of it. We don't know if they impact us specifically."*
		Knowledge	A	Knowledge overall -*"I tend to have to tease it out of people [their understanding of carbon in procurement], what they know about it and what they don't know about it."* *"People have a very low understanding of carbon and resource efficiency in procurement. People do not understand how to implement it into procurement."* Awareness of support organisation - *"They could definitely improve their awareness of organisations that can help. There are some people who work in procurement who don't know <name omitted> or what <name omitted> do, or how any of these organisations might even support what they do."* Language - *"People do not have a unilateral understanding of what the terminology is…"* *"I get quite confused by it all. For example, what is embedded carbon?"* *Lack of understanding of certification - "Focus is more on certification than anything else. What they do, I couldn't tell you. The procurers just get that ticked off."* *"We tick of these certifications but do not have much understanding of them. There are a few different ones including Green Dragon and ISO14001."*
		Skills	A&B	*"I would say that procurement is quite a specialism, and people [procurers] don't generally understand that, let alone low carbon procurement. So, again, there I think there's scope to help people understand it more, what opportunities there are for them to build that into specifications of the procurement processes themselves that then feeds through into what delivery is actually taking place."* *"There is a need to understand more about the cradle to cradle concept. People get too narrow minded with the concept of procurement and that's very much down to skills."*

	Uncertainty		A	*"When you go through the process of procurement you get to know your suppliers. I came up with a procurement solution which would heavily reduce the need to buy. This would also mean lower emissions. I thought it would initially be an easy sell but then when you are faced with the social aspects of sustainability, that mean's job losses, reduction in a supplier, a lost relationship and harder sell. It's catch-22."* *"Our purchases are at times very unique, like repairs to our castles and slate roofs. In these cases, there isn't clear direction over how to handle areas of resource efficiency or carbon. It becomes a fear embedded into the topic, into the product or service purchases so we talk about it, everything around the actual project or product, e.g. delivery. That's not much of a strategy."* *"There is so much going on at the moment, election, Brexit. The government we have today doesn't know if they are coming or going. This is impacting the agenda in the sector. Maybe we won't even focus on carbon reductions after Brexit. It's all back on the table isn't it. No point us trying to fight it out today, let's see where this all leads and take it from there."*
	Cost/Price		A&B	See main body.
	Silo behaviour	Silo budget	A	*"They [public organisation] had an IT department who would buy stuff they wanted. As they had budget allocation, they would not go through procurement. If they want another ten laptops, they just buy the ones they have always had…. Rather than look at things differently, to see if there were different ways of buying the item, so buy with recycle content, buy or lease or a managed service."* *"In procurement, there is talk about money and budgets, however, let's make it clear we don't all have financial delegation. That's held locally in departments, budgets reflect power."*
		Silo working	A&B	*"Internally, within government departments they were talking about <major transport project, name emitted>… It just seems to be that they've [project teams] taken forward the <major transport project, name emitted> just as a completely standalone, individual thing, and then they're doing this <major rail project> in the same area. But they're not linking the two."*
Micro	Lack of awareness		A	*See main body*
	Lack of motivation		A	*"I haven't got the motivation for LCP. We are about to potentially lose our jobs. I don't really understand LCP either."*
	Lack of interest		A	*"You have the willing. But there's also a group that really just don't care. I don't think they are bad people, but these are the people we should be focusing on, we haven't got the message early enough to them. There's a lot more to it, some just haven't jumped on the bandwagon, some we haven't perhaps given that helping hand to."* *"You have the old school lot [older procurers], some haven't really taken to this agenda. You hear the comments such as 'oh, here comes the tree hugging brigade', 'the do-gooders are out in force today'. It is quite comical, but at times can be distracting for the importance of this topic."*

6.11 Integrated model and scenarios

Drivers, enablers and barriers operate on different levels and interact. Figure 6.4 illustrates some of the key connections across the three levels.

Figure 6.4. Integrated drivers, barriers and enablers Model

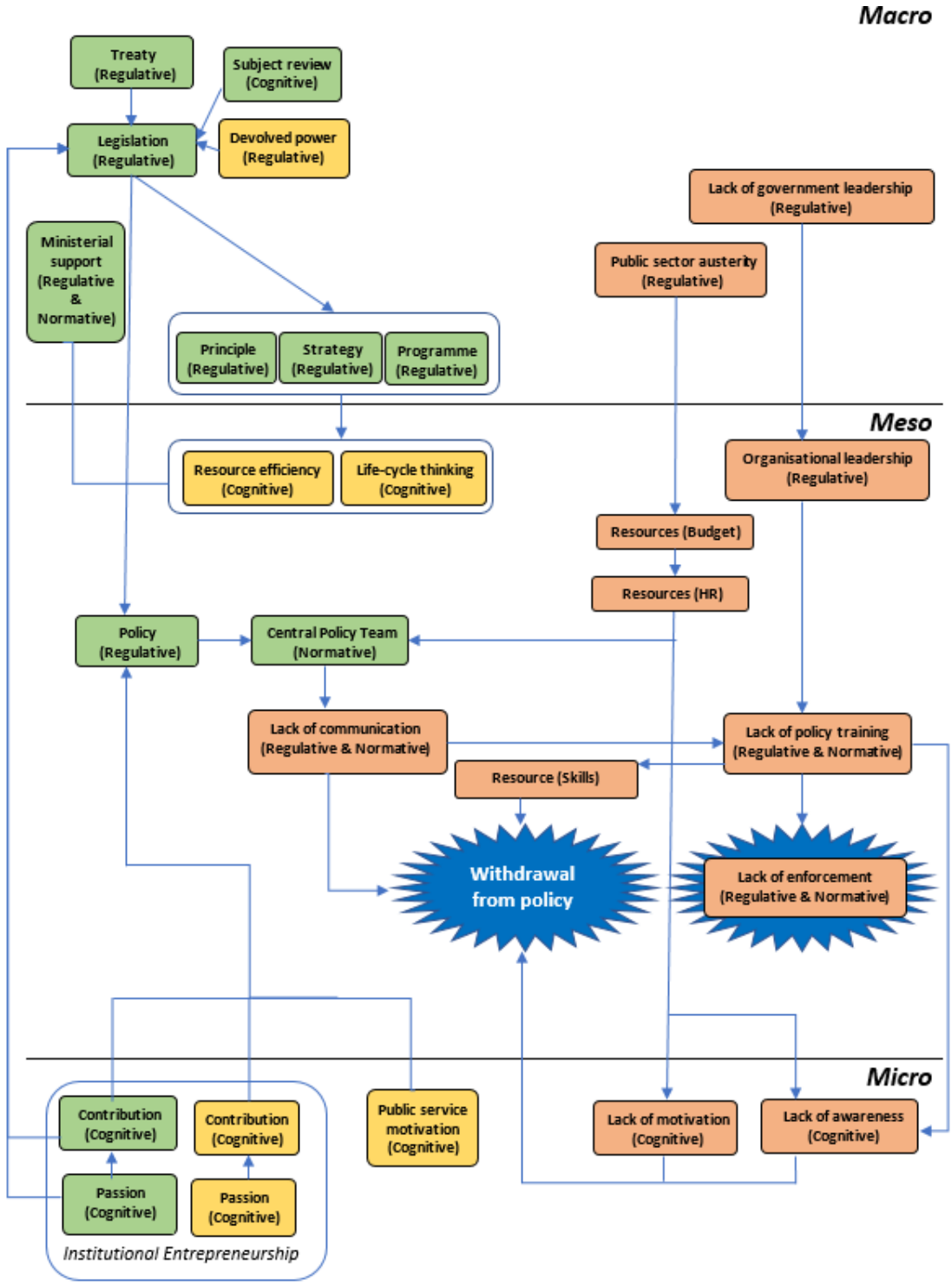


Key

Description	Meaning
	Driver
	Enabler
	Barrier
	Elements related together
	Direction of influence
	Outcome

To provide further insight into how drivers, enablers and barriers operate and interact, two additional diagrams have been developed, outlining key interactions in detail. A set of propositions is put forward, which can serve as a basis for researchers to further explore the multi-level implementation of LCP. These propositions also have a practical purpose and can assist policymakers and procurement professionals to understand, promote and facilitate the implementation of LCP. Figure 6.5 outlines how policy drivers operate and interact with austerity and lack of leadership, while the Figure 6.6 looks more closely at the procurement process.

Figure 6.5. Policy scenarios



Proposition 1: At the early stages of implementation institutional entrepreneurs at the micro level mobilise to drive new legislation at the macro level, which in turn supports LCP implementation at the meso organisational level.

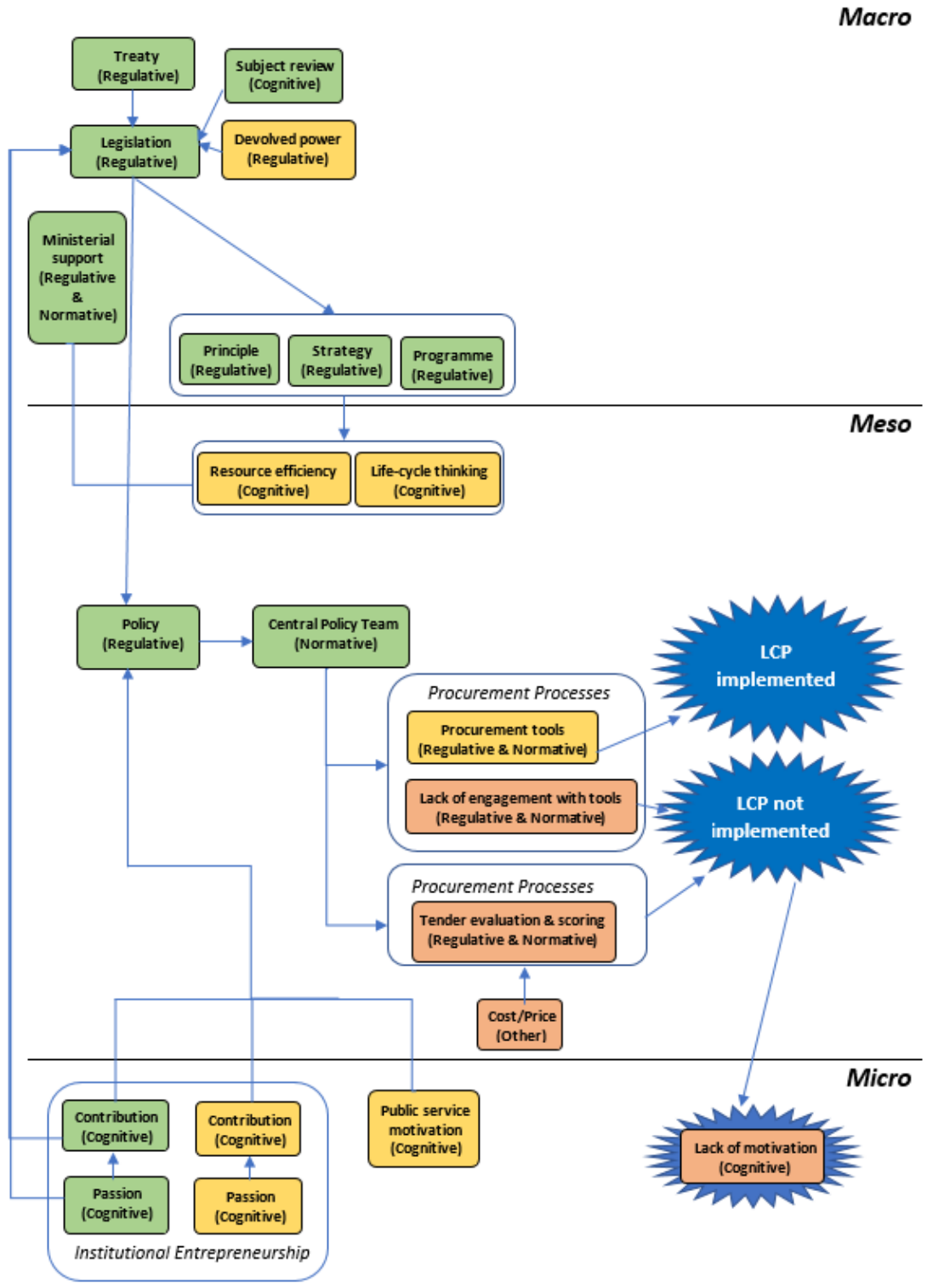
Proposition 2: A lack of government leadership at the macro level will negatively affect organisational leadership at the meso level, which in turn may lead to the withdrawal from policy supporting LCP.

Proposition 2a: Government leadership at the macro level enables the implementation of LCP at the meso level.

Proposition 3: Austerity at the macro level often translates into a reduction in budgets and human resources that adversely impact the central policy team, and in turn negatively affect the ability of procurement at the meso and micro levels to implement LCP.

Proposition 3a: The combination of key factors at the micro (institutional entrepreneurship and public service motivation) and resources (human resource, budgets and skills) at meso levels, positively influence the implementation of LCP.

Figure 6.6. Procurement process scenarios



Proposition 4: The introduction of procurement tools at the meso level positively influences LCP implementation in the procurement process.

Proposition 4a: The multiplication and misalignment of procurement tools over time at the meso level hinders the implementation of LCP during the procurement process and reduces the motivations of procurers at the micro level.

Proposition 5: Institutional entrepreneurship and public service motivation are key factors at the micro level that support coherent policy drivers at the meso level, which in turn facilitate the development of procurement tools that support LCP implementation through the procurement process.

Proposition 6: At the meso level, tensions between carbon and cost during the 'evaluation and scoring stage' hinders the implementation of LCP.

6.12 Implication

There are several potential avenues to develop these findings in further research, however, it would be impossible to explore all these avenues within the context of a PhD. Moreover, there are concepts such as 'alignment' which emerged in the data which are already being addressed. Wales is currently in a process of transition, and it is hoped that some of the implementation barriers identified in this thesis will be mitigated as part of this process. There is scope within the parameters of the PhD to go beyond observation and conduct further exploration to examine: How can practical interventions enable the transition towards the effective implementation of LCP?

Table 6.12. Cycle Two outputs

Outputs	Description
Discussion with policy team	Informed by CPT that a review of policy and tools will take place, taking Cycle Two research findings into consideration. Informed by CPT, changes have taken place with the Community Benefit tool, lowing the threshold and introducing a new 'Good and Services' Community Benefits tool.
Communication with FG office	Meetings with policy officer at FG office. Presented findings of Cycle Two. Officer informed transformational leadership will be planned as part of FGC long-term goals and ambitions.
Personal and professional	Growth in professional skills, managing, researching and contributing to literature and practice. Presented Cycle Two findings at an international research workshop (Sao Paulo, Brazil).
Cycle Three	The findings and discussion in Cycle Two contributed to the direction of Cycle Three.

6.13 Summary and Conclusion

This chapter presents the findings of Cycle Two, which was focused on addressing two specific research questions. By conducting thirty-four semi-structured interviews, in conjunction with secondary data analysis, direct observations and reflective diary entries, the author managed to procure rich data and gain insight into participants' experiences of LCP within their respective roles in the public sector. The empirical data generated from Cycle Two centred on the drivers, enablers and barriers from a multi-level perspective. The primary objectives were two-fold: first, to identify the major drivers of LCP and examine how they operate; and second, to identify the major barriers and enablers within the public sector and examine how they operate and interact. The research identified that barriers and enablers can often be perceived as two sides of the same coin, i.e. that a potential enabler can become a barrier if it is not managed effectively. The study has also established that IT is a suitable lens through which to explore LCP within the public sector. Resource-Based View (RBV) was recognised as complimenting IT on a Meso level by virtue of its capacity to recognise some of the outliers in the data.

Once the data was analysed, the author composed and presented three conceptual models that delineated the respective drivers, enablers and barriers that were identified on the Macro, Meso and Micro levels. The models present the wealth of data collated succinctly in diagrammatical form. A further model integrating drivers, enablers and barriers was then presented along with policy and procurement process scenarios to provide further insights.

To conclude, it is important to note, by the end Cycle Two, the author was able to review LCP in the public sector in a more abstract way and identify and present interconnectivity between the themes and concepts at three levels, e.g. '*lack of alignment'* (Macro), *'uncertainty'* (Meso) and *'lack of motivation'* (Micro). A set of propositions were put forward, which can serve as a basis for researchers, policymakers and procurement professionals to understand, promote and facilitate the implementation of LCP. Though, a broad range of drivers, enablers and barriers for LCP have been identified in Cycle Two, along with an examination of how they operate across three distinct levels and interact with one another, where barriers exist, it was not apparent from the data whether practical interventions can enable the transition towards the effective implementation of LCP? This provides an stimulating avenue for further exploration in Cycle Three, which will be discussed in detail in the next chapter.

7 Cycle Three Findings and Discussion

7.1 Introduction

Cycle Three, evolving on from Cycle Two, provided an expedient opportunity to explore how practical interventions can enable the transition towards the effective implementation of LCP. Intervention took place through workshops which included insight into LCP and activities to inspire participants to make changes and implement LCP. The workshops provided a creative method through which to engage with and educate the participants. The activities were tailored and relevant to their role. This chapter presents the findings and discussion emerging out of Cycle Three. As aforementioned, Cycle Three built upon the findings of Cycle Two and set out to answer the following question:

RQ4: How can practical interventions enable the transition towards the effective implementation of LCP?

7.2 Workshop overview

This chapter will now present an overview of the workshops. Cycle Three was formed using the action research strategy (McNiff 2013), which involved reflecting on the outcome of Cycle Two, to direct Cycle Three. This focused on allowing the story to evolve (McNiff and Whitemead 2011). Cycle Three was pragmatically conducted in two parts. The first part involved participants attending two, three-hour interactive workshops that were held between September and November 2016. The second part involved following up with these participants twelve months later to analyse if intervention has enabled change to take place, which in turn enables the transition towards the effective implementation of LCP. The interactive workshop framework outlined by Pavelin et al. (2014) was applied. The workshops, as a practical intervention, were promoted as interactive and physical aids were used engage the participants and encourage them to share their understanding of LCP. The workshops included time for group discussion and activities to engage and explore levels of knowledge. Examples from established organisations, such as Apple and Walkers, were cited to emphasise how organisations can participate in LCP. Using a simple video to explain what carbon footprint meant, proved beneficial. The workshop was intentionally designed to facilitate interaction and allow participants to ask questions throughout the session. This discourse enabled the author and the participants to gain knowledge from each other. Slideshows was used by the author to educate and transfer knowledge, along with multiple exercises.

7.3 Pre-workshop knowledge check

Participants were asked to write on Post-IT notes a *'word'* or *'phrase'* that they associated with carbon dioxide. This exercise focused around '*word association', which* served as both an ice-breaker at the beginning of the session to encourage interaction and was also used as a knowledge check exercise. Carl (1976) explains that word association can reveal a person's subconscious mind (as it shows what things they associate together). The participants were then encouraged to display these on the wall for everyone to view. Figure 7.1 presents the compiled findings and how many times they appeared (represented by the multiply symbol).

Figure 7.1. Initial thoughts about carbon

'Gas', *'Greenhouse effect' 'Global warming'* were expected words and phrases used. Following on, there was clear word associations with the terms such a *'Transport', 'Vehicle emissions*' and *'Fuel'*. Although all the participants were from a procurement background, they did not make a direct link to it and only one connection was made to *'production'* and one with *'consumption'*. This activity was used to tailor the remainder of the workshop to the knowledge level of the participants.

Knowledge category

Individuals were asked to stand in one of four categories allocated to different parts of the room; these categories reflected their self-assessment of their knowledge and understanding of LCP. Sitzmann et al. (2010) explains self-assessments of knowledge are participants estimates of how much they know or have learned about a particular domain. This not only gives them power but also removed the burden of developing mechanisms to measure knowledge levels. The results are displayed in Table 7.1.

Table 7.1. Pre-workshop knowledge check

Category	***Levels of Understanding***	***Participant's self-assessment of understanding (Pre-workshop)***
1	Very little knowledge	11
2	Some knowledge and growing	5
3	Good solid understanding	2
4	Expert in the field	0
	Total participants	18

Table 7.1 indicates that the participants had a limited understanding of LCP. 61% assessed themselves as belonging to category one, *'very little knowledge'*. One notable observation is that the Energy Manager and Environmental and Sustainability Officer, who were both involved in procurement, categorised themselves as having a *'good solid understanding'*, which was to be expected given their role and experience in relation to carbon.

7.4 Activities

There were various activities used in the study to make the participants engage and gain knowledge about the implementation of LCP. More specifically, these activities focused on drawing their attention to both the correlation between procurement and carbon emissions and the various steps that could be taken to reduce carbon. It would be out of scope to cover all activities in depth. A small selection will be discussed in this chapter.

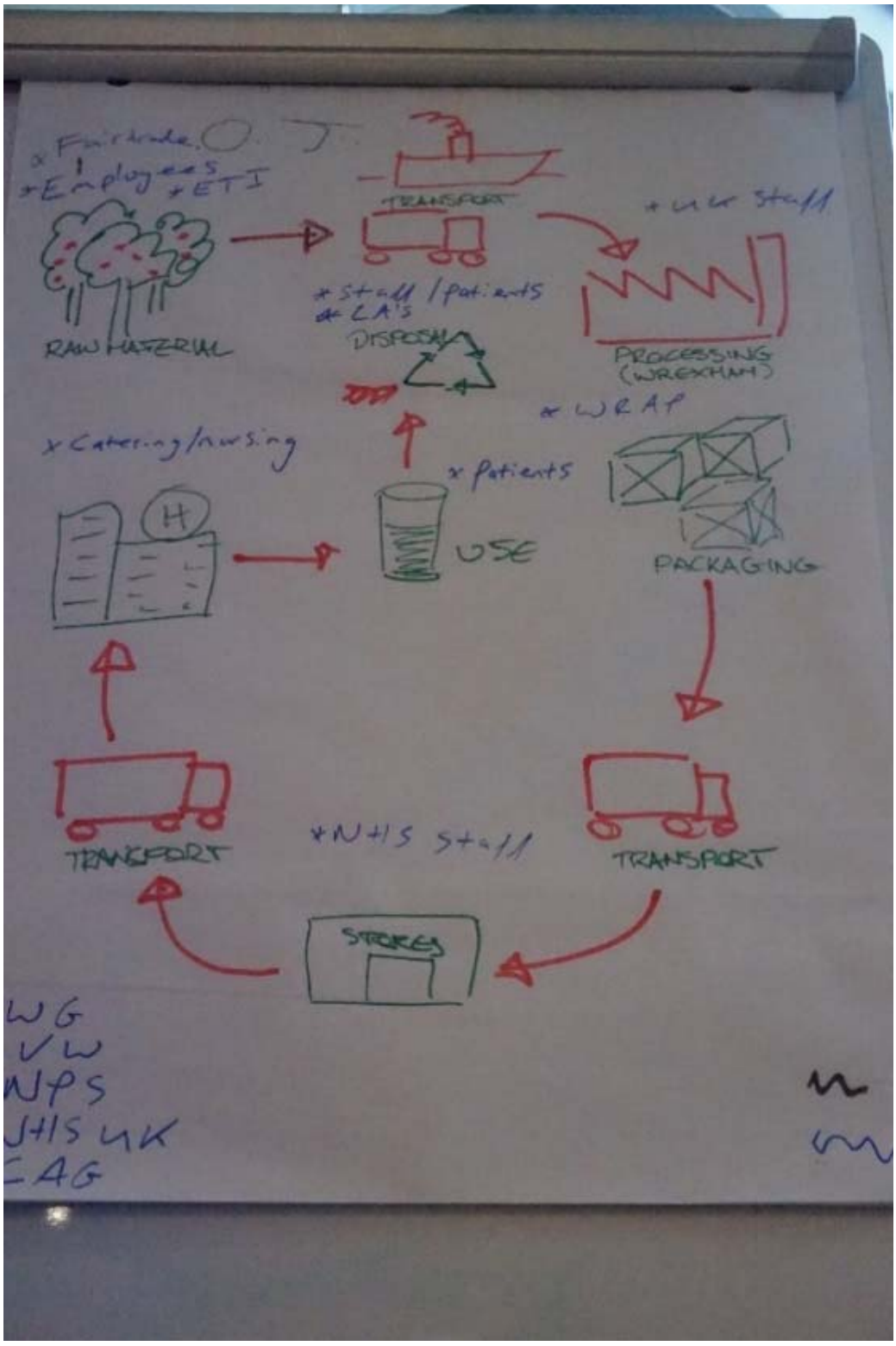
Action One:

(1) Please draw the life-cycle of a key product or service you often buy for the NHS?

(2) Discuss with a partner where you think there might be carbon emissions emitted into the atmosphere?

As part of Activity One, participants were encouraged to be creative by drawing life-cycle diagrams. Figure 7.2 and 7.3 depict two examples involving 'orange juice' and 'surgical equipment'. As part of the 'story-telling' feature of AR (McNiff 2013; Reason and Bradbury 2008), the participants were encouraged to freely express themselves when telling the story of the product life-cycle to answer the two activity questions.

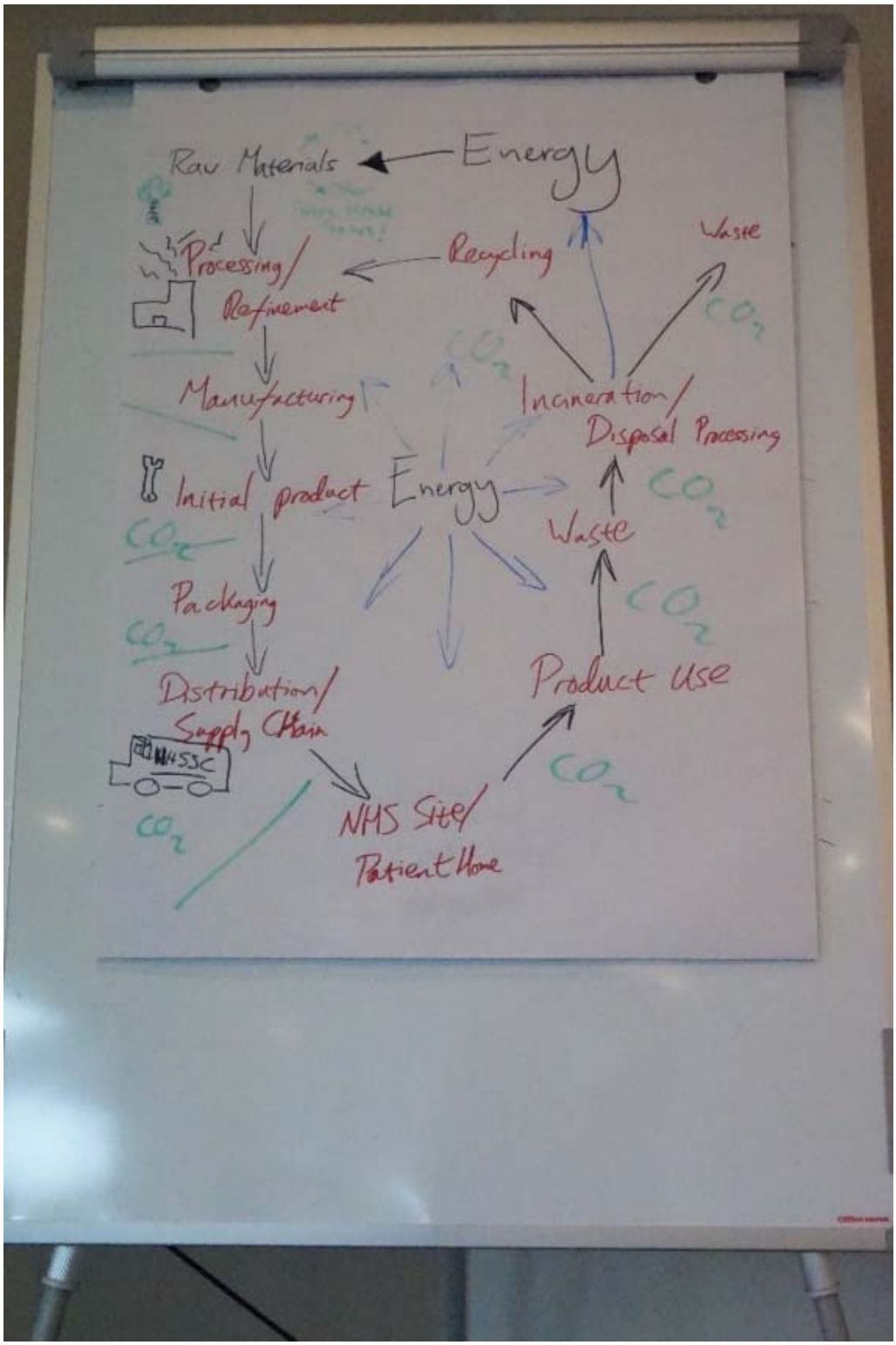
Figure 7.2. Orange juice



This image tells the story of an orange juice carton. The participants outlined each stage of the life-cycle and identified opportunities to reduce carbon. The participants also used this diagram to illustrate the different stakeholders involved in the process. By visually outlining the journey of an orange juice carton the participants noted they were able to consider

procurement more long-term. The work of Parrikka-Alhola and Nissinen (2012) refers to the value of life-cycle thinking. Life-cycle thinking is an important concept to implement LCP. Figure 7.3 outlines the life-cycle of a surgical equipment.

Figure 7.3. Life-cycle of surgical equipment



In Figure 7.3, the term *'CO_2'* was placed to represent where the participants believed carbon to be present. By carrying out this exercise the procurers explained they were now more aware of how carbon was present at all stages of the life-cycle. The participants explained that even the disposable of the product could have different stages and may not always be suitable for recycling. In an ideal situation a procurer would be able to consider all parts of the life-cycle adequately and opt for recycling, but some purchases are complex and sensitive.

The workshop group explained due to the product life-cycle being lengthy and at times complex, it would become difficult to fulfil aspects within the procurement process to fully implement LCP. As earlier mentioned, this can lead to what Rittel and Webber (1973) refer to as a *'wicked problem'*, where the problem has no straightforward answer. As a result, procurers explained it is easier for them to pursue '*quick wins'* connected to transport or deliveries (Walker and Brammer 2009). Procurers, however, appeared to want to pursue LCP more strategically but were constrained due to barriers including their own knowledge and skills in the area, as well as organisational barriers such as budgets. The work of Rushmer et al. (2014 p. 558) notes *"changing a person (educating, persuading and motivating them) will only work if people are the primary barrier to change."* However, in the wider context procurers operate in organisations, which also have other pressures, demands and capacity issues. Another barrier that appeared through discussion was lack of leadership.

Diary Entry: Leadership

Nov 2016

During my workshop today, one of the participants, a Category Manager, lambasted the current failings in the system. He explained that leadership is required, that it must first come from the top and that at present we don't have that. The context of these comments centred on the manner in which certain procurers are simply allocated a task without strong guidance, support, or direction from above from government. Additionally, it was pointed out that LCP required long-term commitment, but the leadership within government and public organisations were only looking at the short term.

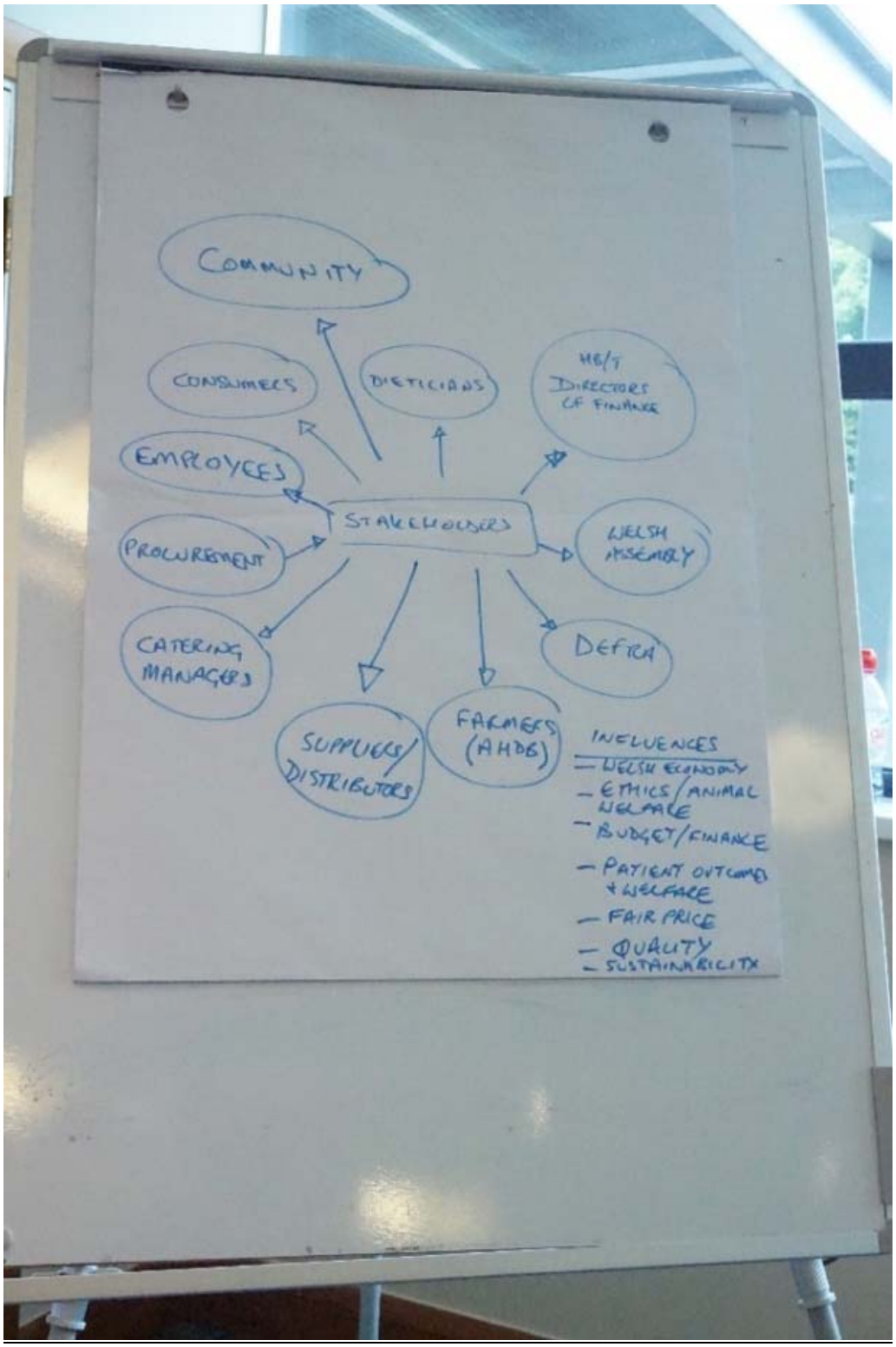
The general consensus in the workshop with respect to these remarks was that low carbon procurement needed to be a long-term collaborative endeavour with strong governmental/policy leadership cohesively geared towards low carbon, whereas, at present, it appeared like dictated orders from above that lacked clarity, understanding, consistency and direction which, ultimately, served as a barrier. These comments reinforced the importance of leadership at different levels. It further demonstrated that procurers often felt alone with little control.

This participant aired his frustrations towards the lack of leadership. It was interesting to observe this finding in the workshop and view the consensus amongst participants. Pavelin et al. (2014) explains this is the uniqueness of interactive workshops. Activity Two consisted of three parts as noted below:

(1) Adopting a life-cycle approach, in pairs write down both the internal and external stakeholders for the product/service selected in activity one.
(2) How might they affect or be affected by the procurement of the product/service?
(3) What helps and hinders this process?

Procurement of milk was selected by participants as it was a common purchase and used by staff and patients at the hospital. Figure 7.4 outlines the key stakeholders connected with the procurement of milk.

Figure 7.4. Milk stakeholders

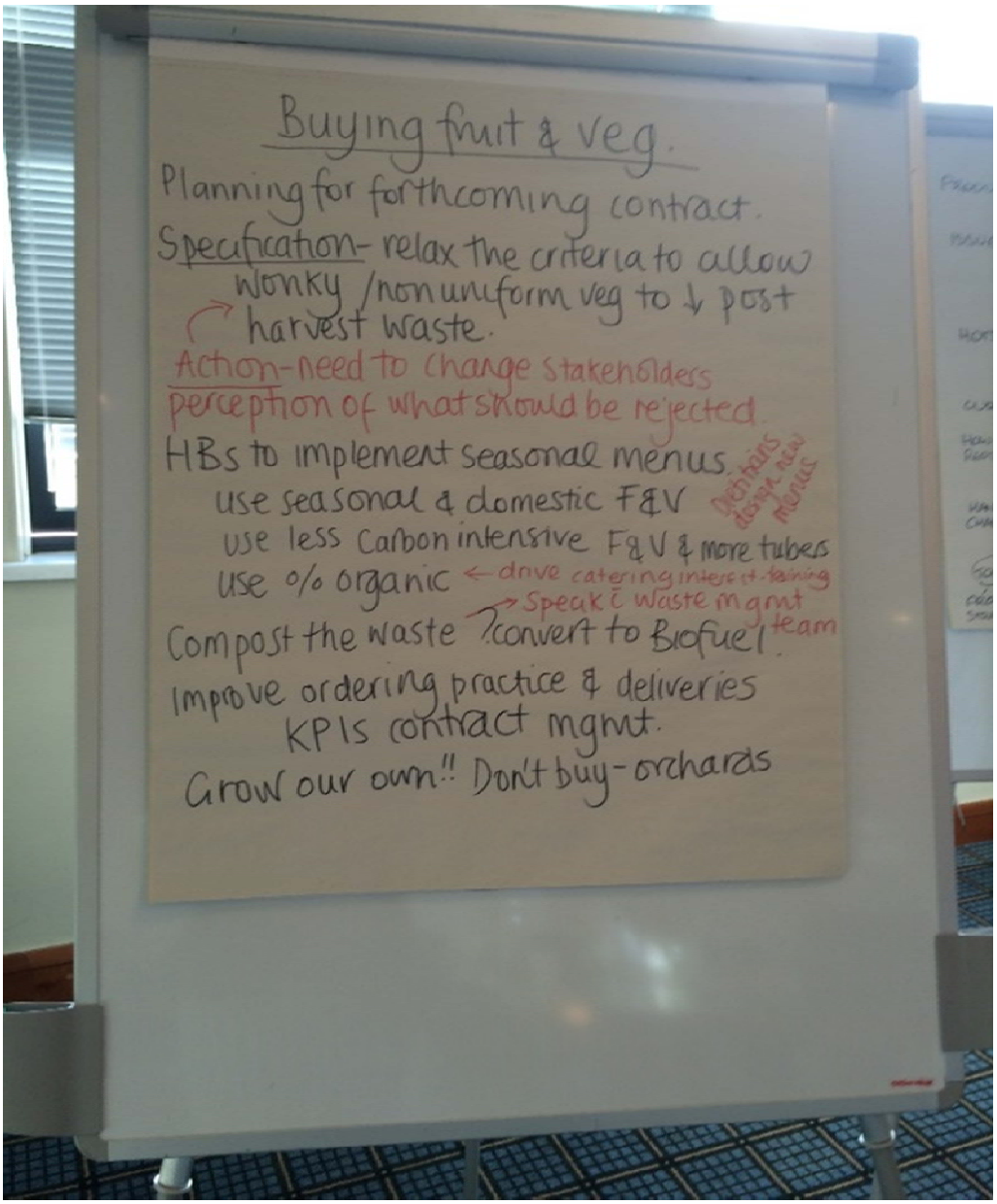


This image outlined the various stakeholders involved in purchasing milk using a bubble and arrow diagram. The rationale for using this diagram was to show the various stakeholders and their respective groups. At the bottom of the diagram they listed the stakeholders'

influence. This highlights there are several stakeholders connected to the procurement process. When discussed, the group noted that hospital patients were the most important stakeholders. Activity Three, will not be discussed in this chapter but can be found in Appendix I.

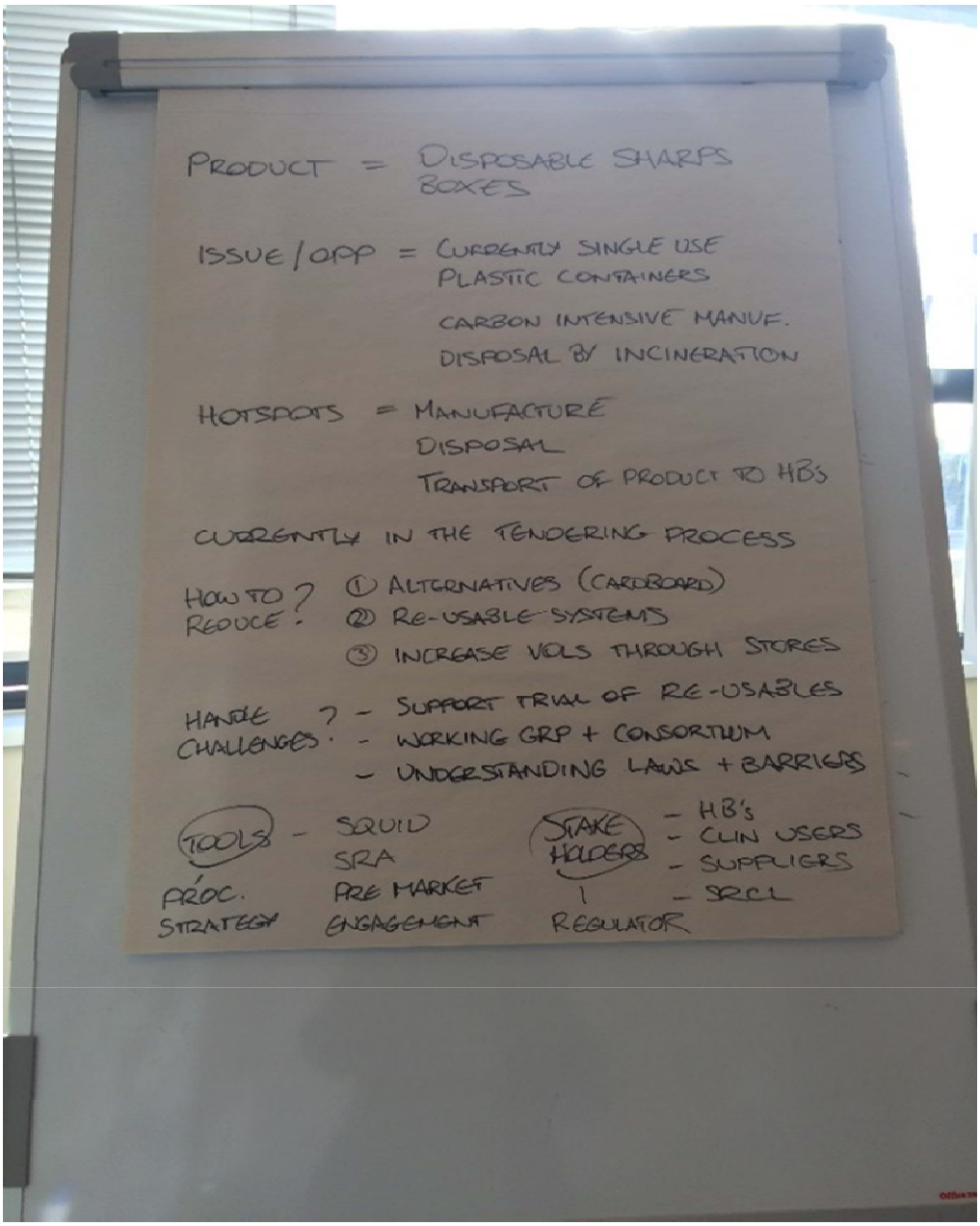
Activity Four was conducted at the end of the second workshop and involved a hypothetical scenario in which participants were given an allocated time to implement change in procurement. Rushmer et al. (2014) explains there is no guarantee of change taking place. As such, this task provided an opportunity to identify if the intervention enabled the transition towards the effective implementation of LCP. As part of Activity Four participants were asked to put their knowledge into action. This task brought together the knowledge and skills gained during the workshops. Figure 7.5 and Figure 7.6 illustrate how procurers would implement LCP as part of the procurement of 'fruit and vegetables' and 'disposable sharp boxes'.

Figure 7.5. Procurement of fruit and vegetables



The image outlines the pending procurement of fruit and vegetables. The consideration of *'remove', 'reduce', 'reuse'* and *'recycle'* are factors considered in this image. The participants outlined how they would implement this within the procurement process and who they involve .e.g. dietitians. They noted they were inspired by the workshop to reduce waste by buying 'wonky' vegetables and explored growing vegetables in the hospital allotments.

Figure 7.6. Disposable Sharp Boxes



The procurement of disposable sharp boxes was selected and outlined in the image above as they are regularly used in NHS Wales hospitals. The image outlined an action plan, procurers would put in place which considered hotspots and knowledge gained in the workshops. The diagram also incorporated different tools, stakeholders and options available during the procurement process. As the procurement of the disposable sharp boxes was already in the tender process the participants discussed the changes they could make during this process, as well as the challenges they would face to overcome them.

The illustration of the procurement of fruit and vegetable and disposable sharp boxes visually presents the knowledge gained through the workshop. The detailed images also reflect the confidence that procurers gained by the end of the two workshops.

As mentioned earlier Rushmer et al. (2014) explains interactive workshop, though they can be a mechanism for sharing knowledge across professions, there is no guarantee this will be transferred to participants and practice. As a result, the workshop concluded with a final question being asked to participants:

How would you explain Low Carbon Procurement to someone?

The purpose of this exercise was to gain an understanding of how the participants digested the material from the workshop. Data was gathered through the words and phrases that came to mind. The findings are presented in Figure 7.7.

Figure 7.7. Explaining LCP

Explanations of LCP displayed were broad. However, there was some level of sophistication to some answers. Responses confirmed participants had digested the material from the workshops including *'hotspots'* and *'target, measure, save'* concepts. The term challenge was used in a positive manner. The responses also looked beyond just delivery miles. However, there were also responses which outlined barriers to LCP including up-front cost which referred to the short-term thinking. *'£ vs Carbon'* was a point that stood out, even after the workshop cost remained a barrier. As mentioned in Cycle Two, there are situations where *'cost/price'* of low carbon goods and services are dearer compared to standard products

without a low carbon feature, which hinders the implementation of LCP. Cost as a barrier is dominant in the current research (see Aldenius and Khan 2017; Brammer and Walker 2011, Correia et al. 2013; Kordestani et al. 2017; McMurray et al. 2014; Walker and Brammer 2009). For effective implementation of LCP these factors need to be taken into consideration as they hinder LCP.

7.5 Post-workshop knowledge check

The final stage of knowledge checking involved the repeat of the self-assessment of the participants knowledge checked which was completed immediately at the end of the workshop.

Table 7.2 provides a comparative illustration of the levels of knowledge pre- and post-workshop.

Table 7.2. Knowledge check pre-and post-workshop

Category	***Levels of understanding***	***Participant's self-assessment of understanding***	
		Pre- workshop	***End of workshop***
1	Very little knowledge	11	0
2	Some knowledge and growing	5	5
2.5	Good understanding	0	5
3	Good solid understanding	2	6
3.5	Near to an expert	0	1
4	Expert in the field	0	0
	Total participants	18	17

Table 7.2 displays the self-evaluated levels of knowledge both pre- and post-workshop to understand if the practical intervention had been useful. Between the two workshops, one participant had to withdraw due to work commitments. This table differs from Table 7.1 in that the author permitted the participants to amend the scoring criteria to include 2.5 and 3.5. This again demonstrates to the flexibility of the AR research setting, as the author was able to permit this change and evolve with the research (Reason and Bradbury 2008). Overall, the table illustrates that the intervention had resulted in change in knowledge, as prior to the workshops eleven participants (61%) identified as having very little knowledge, which was reduced to zero after the workshops sessions. What can be taken away is that practical interventions within a controlled setting can enable change. In turn, it was hoped

this knowledge gained will enable the transition towards the effective implementation of LCP.

7.6 Feedback

To close the workshop feedback cards were provided and participants were voluntarily asked to provide feedback which is outlined in Figure 7.8.

Figure 7.8. Feedback

"Very positive, informative workshops which will help shape the work we are doing going forward. Thanks"

"Great :-)"

"Really useful and helpful session. Made me consider how I can implement low carbon procurement into tendering and contract management. Thank you!"

"Hush, good to have interactive sessions. Well thought out training, good time management. Thank you."

"Informative workshop, better understanding of carbon and the impact."

"This session was very helpful and has given me a better understanding on carbon in procurement in the NHS. Thank you."

"Informative and made me think and have a better understanding. Thank you."

"Very informative and thought provoking."

"Workshop was very informative and particularly coming from an energy background – this was engaging, well facilitated too! Thank you."

"Very well presented and interactive!"

Feedback was positive from the workshop groups. However, the impact the workshops had made was yet to be seen (i.e. enabling the effective implementation of LCP). Following the workshop, in December 2016 the author met with management team at NHS Wales to discuss the workshop and gain feedback. A short note from the author's research diary makes reference to this meeting.

Diary: NHS Meeting, post-workshop

December 2016

I've had a meeting today with the NHS procurement management team. Overall, the feedback following the workshops was positive and the general outcome was that participants felt more equipped to effectively implement LCP than before. There was, however, still reference to legislation and other financial barriers they were facing due to the strain on the NHS and recent budget cuts. These did not prevent all LCP activity, but undoubtedly acted as a hindrance, ''barrier'' to it.

The diary extract highlights the contextual factors that can also enable or become a barrier to LCP. Grandia et al. (2015b), note in their publication *'It's not easy being green'* due to the factors such as the contextual dynamics at play.

7.7 Mid-range impact

As part of AR it is important to analyse and evaluate the findings. It was important to pragmatically check mid-range change. This also complimented the workshop framework by Pavelin et al. (2014) who recommends to *'follow up with your participants'*. The work of Rushmer et al. (2014 p. 557) explained the *"Follow-up activity (knowledge to action) appeared to rely solely upon individuals' good will, capacity and determination."* Taking this all into consideration participants were followed up twelve months after the workshops and asked two questions to identify whether mid-range change had taken place in their procurement activity. In total, five responses were received back from the participants. Not all of the participants were available to feedback; three participants had officially left the organisation (although the author's own enquiries indicated that this number was much higher) and there were some unavailable to respond due to time constraints, which was reflective of earlier findings. A presentation of the follow-up responses can be found in Table 7.3.

Table 7.3. Participant's follow-up responses

Participants	Q1: What changes have you made in your role to reduce carbon through your procurement activity?	Q2: What impact has this made? For example, X amount less to landfill/reduction of energy use/better understanding in department, etc.
Category Manager C	*"As a team we have started asking more focused questions of the supply base during the tender process to try and increase the awareness that NHS Wales are looking for more low carbon products and processes."*	*"This has provided us with more data around supplier's processes and products to assist Health Boards and Trusts with reporting. This will be an area we will work on with suppliers during the course of the contract to try and drive improvements."*
Assistant Procurement Officer	*"I cannot give set examples, but I am more aware of carbon footprint when I do quotes / tenders, etc."*	*"We are looking at conducting further confidential waste tenders, and expanding the current services that we have, this also impacts on CSR, and how we help the local community. Unfortunately, I could only attend the first session, but found it very informative, and useful going forward, many thanks."*
Category Manager A	*"The added knowledge picked up as part of attending the event has allowed me and my team to be better educated and informed on the ways in which we could potentially reduce our environmental impacts based on the contracts we put in place.* *As we have been working closely with the <collaborative buying organisation: name emitted> on collaborative frameworks which will cover the majority of our portfolio, we have not had a great deal of opportunity to implement any of the potential techniques covered in the course. However, that being said, we will be running further competitions in due course, so we may be able to apply these when doing the mini-competitions."*	*"As we have not had many opportunities since attending the course to run tenders, it is not possible to say what impact this could have.* *One of the anticipated challenges is the price suppliers will put on the added work that may be involved to deliver some of the sustainable goals."*
Food Support Officer	*"Produced a new food ordering system to reduce the amount of deliveries to site. This also led to better stock control."*	*"Fewer delivery vans driving to site, less carbon in the atmosphere, also due to less stock being held the freezers on site don't have to work so hard."*
Category Manager B	*"Increased usage of central stores [i.e. NHS warehouses]."*	*"Lower number of deliveries to Hospital sites through delivery aggregation."* *"Lower number of urgent stock orders (with higher delivery costs)."*

In addition to the responses in Table 7.4, both Category Manager B and Category Manager C provided additional information which is reported below:

> "This is part of a programme to drive as much bulk stock via our distribution stores in Bridgend, Denbigh and Cwmbran. As part of every tender, we look at what is currently in Stores and what is being purchased that could potentially be put into Stores. We work with colleagues from Stores in order to identify suitable products (gloves, gowns and drapes are a good example from my areas).
>
> In addition to this, we have been actively removing items that are in Stores from each Health Board's direct order catalogue. This helps prevent users from ordering direct from supplier when they should be purchasing via Stores.
>
> *To give you an example of the scale of this:*
> *> In the last 12 months, NHS Wales purchased 127.6 million examination gloves (or pairs in the case of sterile ones)*
> *> Of these, 89.5 million were distributed via one of our Stores (36,800 individual orders)*
> *>This means that 70% of our gloves are distributed via Stores*
> *In theory, this means that 36,800 deliveries are aggregated with other products to reduce the number of courier deliveries. While it would be almost impossible to put a number on exactly how many deliveries have been removed.*
>
> All of this helps us to rationalise what is used in hospitals by limiting choice to the contracted products. Additionally, it reduces the number of required deliveries by couriers to Hospital sites, which reduces on-site congestion and provides the opportunity to reduce storage required at hospitals.
>
> We have not actively pushed additional products into Stores over the last few years due to space constraints, but this is changing soon as they are clearing out unused products to make room for faster moving lines."
>
> Category Manager B
> **NHS Wales**

> *"We're trying to use the tender process to increase awareness. During the procurements we have used the questions about the recyclable content of plastic based products and due to the nature of their use and the recycled plastic can only be used in certain circumstances. We're trying to gather more information about this through the process and to use contract management as a vehicle to monitor improvements during the contract's life.*
> *Ultimately, a tender could be won or lost on supplier's responses to these questions.*
> *One of the projects is circa £700k p.a. and the other circa £70k p.a.*

We have working groups that will monitor any potential improvements on recycled content and carbon footprint for one and the other will be by way of an annual report. They'll be conducted by procurement (our team) with the stakeholders.
NHS Scotland have since adopted a similar approach, so supplier's need to show a willingness to improve processes and increase recycled content where appropriate to win tenders."

Category Manager C
NHS Wales

Table 7.3 outlines five participant responded to the two questions. It was surprising to receive five participant responses twelve months later. This can possibility be credited to building rapport with the management team at NHS Wales and the central procurement team who were supportive of the study. Participant responses varied. The responses were job role specific, for example the Food Support Officer created a *'a new food ordering system'* which was designed to reduce waste and increase efficiency taking a life-cycle perspective. The reduction of deliveries was a theme that emerged with Food Support Officer and Category Manager B. However, the reduction of deliveries here was more strategic for example aggregating deliveries. Category Manager C has been trying to implement LCP into the procurement process in terms of recyclable content of plastic based products. The value of this procurement exercise was beneficial, and the effective implementation of LCP was encouraging to read twelve months after the workshops. The data presented within the chapter gives indication that even in the midst of barriers such as austerity and resources, practical interventions can enable the transition to effective implementation of LCP.

7.8 Implications

In summary, the findings demonstrate that practical interventions, such as via the use of interactive workshops, can enable the transition towards the effective implementation of LCP. This supported the work of Rushmer et al. (2014: 553), who note that *"through two-way communication and engagement, workshops are believed to facilitate up-take of ideas and ownership of subsequent change."* The findings emerging out of Cycle Three indicate that tangible and positives changes are being made, which supports the transition towards the effective implementation of LCP, despite the profound instability that marks this historical juncture (i.e. periods of significant uncertainty and austerity). The data thus confirms that whilst barriers remain, practical interventions can take place to address and overcome these barriers and, in turn, further enable the transition towards the effective implementation of LCP, which essentially answers the final research question. The logical conclusion to draw here is that if the manifold barriers that are currently in place could be

removed, or at the very least mitigated, then a full transition towards the effective implementation of LCP could potentially occur. Although it lies outside the scope of this thesis, there is scope to carry out a long-term review, i.e. Cycle Four, with the same participants in the future to measure the long-term impact of the practical intervention. Once again, the notion of follow-up research demonstrates the flexibility afforded by AR (McNiff 2013; Reason and Bradbury 2008). Although the author acknowledges that it is impossible to ascertain from the post-workshop review why the implementation of LCP has taken place, one potential answer may be that NHS Wales now has greater knowledge and know-how from the practical intervention to effectively implement LCP.

7.9 Summary and Conclusion

Chapter Seven focused on the centrality of practical interventions and change making within AR. More specifically, the chapter presented data from Cycle Three to answer the final research question (RQ4), which aimed to understand how practical intervention (i.e. interactive workshops) can enable the transition towards the effective implementation of LCP. Levels of participant knowledge were checked both pre- and post-workshops, which revealed participants had a better understanding of LCP after the intervention. The participants were then approached twelve months later with two follow-up questions to review the mid-range impact (i.e. transition towards the effective implementation of LCP) and close the cycle.

It is important to note, the twelve-month follow-up (the final stage of Cycle Three) concluded that practical interventions can enable the transition towards the effective implementation of LCP, as participants had developed greater levels of understanding and became more confident to consider, incorporate and implement LCP within the procurement process. The key point stemming from this research cycle is that some form change can take place, which supports the transition towards the effective implementation of LCP, even during such periods of significant uncertainty and austerity. The final chapter draws the thesis to a close and reflects upon the three-AR cycles, whilst answering the overarching research question. Furthermore, the chapter outlines the contributions of this AR study, identifies potential hurdles and constraints, before providing avenues for further research that stem directly from this research.

8 Conclusion

8.1 Introduction

Chapter Eight concludes this thesis which focuses on the implementation of low carbon procurement (LCP), a niche area of sustainable public procurement (SPP). The chapter reflects the aims and objectives of the three-AR cycles and addresses the four research questions for the purposes of understanding:

How can LCP within the public sector potentially contribute to progress towards sustainability, and how can we understand and manage the processes and factors relevant to its effective implementation?

A reminder of the connection between the three AR cycles and the research questions are presented in Table 8.1.

Table 8.1. Cycles and research questions

Cycle	Research Questions
One	RQ1: How is carbon considered in the procurement process?
Two	RQ2: What are the major drivers of LCP within the public sector, and how do they operate? RQ3: What are the major barriers and enablers of LCP within the public sector, and how do they operate and interact?
Three	RQ4: How can practical interventions enable the transition towards the effective implementation of LCP?

This concluding chapter is structured as follows. Firstly, a brief overview of the three cycles is provided. Next, the findings shall be briefly summarised and related back to the overarching research question. The chapter then discusses research contributions from i) theoretical, ii) methodological and iii) practical perspectives. Further, the chapter underscores the potential impact of the research, and delineates some of the key challenges and hurdles faced during the research process. The chapter and thesis are brought to a close by proffering potential avenues for future LCP research, which are currently unexplored in the field of SPP.

8.2 Summary of findings and answer of overarching research question

The aim of this research was to gain deeper insight into the field of LCP. Before addressing the overarching research question, it is perhaps helpful to consider the evolutionary role of each cycle of inquiry in terms of how it informed the subsequent cycle. Cycle One constituted a preliminary form of research that aimed to gain a broader perspective into LCP within the procurement process and the main challenges within LCP. The research involved interviewing twelve participants from across the public, private and third sectors, as well as examining secondary data and direct observations. Out of the three sectors, the public sector had the most familiarity with carbon and its applicability to LCP. Applying this knowledge, the subsequent phase (Cycle Two) of the research aimed to investigate LCP specifically within the public sector (the largest sector in Wales).

Cycle Two was an extensive research study focused on the public sector that comprised secondary data analysis, reflective diary entries, direct observations and thirty-four semi-structured interviews. The focus in this stage of the research was to explore the implementation of LCP by looking at the major drivers, enablers and barriers, and identifying how they operate and interact at three distinct levels (Macro, Meso and Micro). Cycle Two provided rich empirical data and insight into the participants' experiences of LCP within their respective roles, within the public sector. It involved participants from two distinct groups: Group A, which consisted of participants from procuring organisation; and Group B, which consisted of participants from influencing and support organisations. The themes/concepts associated with the drivers, enablers and barriers were succinctly presented in three conceptual models, each divided over three levels (Macro, Meso and Micro) and, through recourse to IT which was the primary theoretical lens in this study, the findings were also subdivided into the three pillars of IT (Regulative, Normative and Cognitive). The models were then integrated and presented in one model to outline the complexities of LCP implementation. Detailed illustrations of typical scenarios were then presented for academics, policymakers and procurement professionals to understand, promote and facilitate LCP. This allowed the complex range of factors involved to be disentangled into more easily digestible diagrams that could articulate the dynamics at play within the implementation of LCP in the public sector in a more understandable way. By the end of Cycle Two, the author was able to better understand the sector in a more abstract way and to identify the interconnectivity between the themes and concepts across three distinct levels (e.g. *'austerity'* on the Macro level, *'lack of resource'* on the Meso level, and *'lack of motivation'* on the Micro level).

Cycle Three evolved out of the findings of Cycle Two and presented an opportunity to understand how practical interventions in the form of interactive workshops can enable the transition towards the effective implementation of LCP. There was scope within the parameters of this PhD to go beyond mere observation and conduct further exploration in Cycle Three with the express aim of applying the knowledge gained to create educational material that was commensurate with the level of understanding of the participants, in conjunction with educating the participants via workshops in a practical setting (i.e. activities, collaboration and interactive discussions), to establish how practical interventions can enable the transition towards the effective implementation of LCP. Cycle Three consisted of eighteen participants from NHS Wales (public sector) taking part in workshops. Knowledge checks were done, both pre- and post-workshop, and a follow-up inquiry was conducted twelve months later (with five participants responding), which provided an opportunity to evaluate if any mid-range change had taken place. Transition towards the effective implementation of LCP can and, in fact, did take place, but was mitigated by other factors affecting the implementation process, such as regulatory barriers or instability within the sector. This chapter will now answer the overarching research question.

RQ: How can LCP within the public sector potentially contribute to progress towards sustainability, and how can we understand and manage the processes and factors relevant to its effective implementation?

Following the data gathered and the analysis undertaken in this thesis, we can conclude that in order to contribute to progress towards sustainability, LCP within the public sector is best approached in the following way. Specifically, LCP in the public sector should be strategically positioned as a key contributor to the transition towards sustainability and not viewed by those responsible as an additional operational challenge or bureaucratic requirement imposed from above. This supports the view put forward by Bratt et al. (2013) from a strategic sustainability perspective. The data has shown life-cycle thinking is part of the implementation of LCP and may struggle to fulfil its potential until LCP is strategically positioned. Additionally, LCP may continue to struggle through systems and processes such as budget allocation (i.e. procurement budget and waste disposable budget are budgets are not aligned). The data has revealed LCP when affected by austerity weakens it contribution to sustainability and becomes viewed as an *'add on'* and *'optional extra'* where budgets allow. LCP will need to be viewed as a long-term concept contributing to 2020 and 2050

carbon reduction targets in order to effectively contribute towards sustainability. This supports and extends the views of Correia et al (2013) who has strongly spoken about the long-term view and positioning of LCP. This will require the relationship and mindset of procurers, policy officials and government to be aligned with a long-term view and commitment to LCP**.** Repositioning LCP (i.e. strategically) will hopefully enable government leaders to appreciate LCP has implication far beyond annual budgets allocation and as such should not be affected by government implementing austerity measures. LCP will require innovation and entrepreneurial responses on the behalf of the public sector and not just a compliance and/or *'box ticking'* mentality. The procurement tools introduced in the public sector are already a sign of the innovation needed to support the implementation of LCP emerging. Institutional entrepreneurship through forms of *'champions'* could provide an avenue to strengthen the contribution LCP can make towards sustainability. As the study has outlined, champions have introduced new legislations to push LCP through its current implementation struggles. Institutional entrepreneurship will need to be a key part of the LCP journey towards contributing to sustainability. In the long-term, suppliers to the public sector will also need to provide innovative offerings, to support LCP so that LCP can potentially contribute to the transition towards sustainability. So, part of potential for progress will depend upon the effectiveness of communication between public sector bodies and their private sector suppliers, and the responsiveness of those suppliers. The research study has shown, LCP can be viewed as a multi-faceted, complex, interactive phenomenon which primarily operates at the Meso level and is positioned in a web of connections in the public sector that interact within and across different levels. Fully understanding LCP and its potential to contribute to the transition towards sustainability is aided by multi-level analysis and should thus be viewed through a multi-level approach. Adopting IT provides a theoretical lens, which can provide valuable insights into LCP in the public sector. IT in combination with other theories and multi-level research can potentially contribute to further understanding LCP and sustainability. LCP can be understood as connecting with other elements of public sector management that can become either barriers or enablers to LCP. This includes culture, leadership, resources, institutional entrepreneurship and public service motivation, which operate on various levels and interact with LCP during the implementation phase. Such elements are deep rooted and engrained within the public sector and frequently operate within silos, which Cycle Two of the research outlined. When such elements are aligned to support LCP in the public sector, LCP can significantly contribute towards sustainability. The level of influence of these different aspects to LCP has yet to be examined in detail and, as

such, doing so may contribute to our understanding of other sustainability concepts implemented in the public sector. LCP will require organisational, team and individual cultures that supports sustainability.

In order to be implemented effectively and to fulfil its potential in terms of contributing to carbon reduction (and therefore to sustainability), the management of LCP in the public sector would benefit from the following measures: effective implementation and management of tools supporting LCP, training to increase LCP knowledge and skills, supplier certification requests, encouraging champions, practical interventions and transformational leadership. The study has revealed the importance of the tools, without such tools in place the procurement processes fall into the old procurement traditions where there is little or no consideration to carbon. Resultantly, for such tools to be effective they will need to be integrated, aligned, regularly updated with policy that supports. This will need to be supported with training procurers to build up knowledge and skills (know-how) to deliver LCP. Training that supports LCP will need to be tailored to public procurement and policy to be effective. Without such training, it is likely there will be a withdrawal from LCP, which, in turn, will lead to LCP struggling to contribute towards sustainability. The study has revealed well-designed training can contribute to the implementation of LCP in both the short- and medium-term, as well as providing other practical benefits like motivating procurers within their roles. Additionally, supplier certification requests follow the principles of life-cycle thinking and resource efficiency. When requested could contribute to LCP and foster the necessary culture required from suppliers to effectively enable the implementation of LCP. Supplier certification requests should, however, not be viewed as a *'ticking a box'* and instead should be proportionately requested and monitored to effectively implement LCP. In doing so, this will bring suppliers closer to support sustainability. The study outlined, institutional entrepreneur will be able to support LCP implementation. It would be advised to encourage, support and reward such individuals and organisations to fully benefit from institutional entrepreneurship. Finally, factors such as culture, leadership, resources, institutional entrepreneurships and public service motivation interact during the implementation phase of LCP. When such factors do not support LCP, some form of practical intervention may be required. Interventions are a vital stepping stone on the road to sustainability. Without interventions, LCP implementation may be limited. Resultantly, transformational leadership can play a key role in terms of driving interventions that enable the change required for LCP to continue to contribute towards sustainability. In doing so, it

will bring the public sector and its organisation effectively closer to delivering LCP and contribute to the progress towards sustainability.

Overall, LCP in the public sector (particularly in Wales) is well positioned to make a significant contribution to sustainability due to the fact that it operates under the governance of legislation and policies that support sustainability. Moreover, the public sector, through its procurement activity connects with the third and private sector and as a result can drive sustainability across all sectors.

8.3 Research Contributions

8.3.1 Theoretical contributions

This research makes a theoretical contribution to extant SPP literature of which LCP is a sub-discipline. The SLR into SPP literature explored 107 papers (from the original set of 609 papers) according to themes and theories used. The outcome of this was that drivers, enablers and barriers were the dominant research themes. This is to be expected for a field focused on implementation. At present, extant SPP literature focuses on drivers, enablers and/or barriers without distinguishing whether or not they are applicable for LCP as a sub-discipline of SPP. This could be attributed, in part, to the relatively recent emergence of LCP. This provided an avenue through which to explore LCP drivers, enablers and barriers. A further finding emerging out of the SPP literature was that drivers, barrier and enablers were merely reported in a list like fashion, rather than going beyond this to understand how they operated and/or interacted. Within the field of SPP, there was also a relative dearth of literature engaging in theory testing and building, and, in this respect, this research can be said to make a novel contribution to the field of SPP. Although the drivers, enablers and barriers appeared to operate on different levels and interact with one another, the current body of SPP literature rarely explores these drivers, enablers and barriers from a multi-level perspective. Across the full data set only one paper adopted a two-level perspective (Preuss and Walker 2011), whilst only two papers examined the field through recourse to a three-level perspective (Guenther et al. 2013; Trindade et al. 2017). Having said this, these three papers also do so without considering how the manifold drivers, enablers and barriers interact with one another. Consequently, this research makes a novel contribution to the field by addressing these points. An additional clear observation about the SPP literature was that research had not moved beyond reporting the drivers, enablers and barriers, to intervene with barriers, in an attempt to enable the transition towards the effective

implementation of LCP. This research thus contributed to the field by testing the practical intervention designed to enable the tradition towards the effective implementation of LCP. These are the key outcomes of the SLR which this research addressed and can be said to have made a contribution towards. Each cycle will now be discussed in turn, focusing specifically on their foci and their respective contributions to the field.

Cycle One

Cycle One was positioned as an exploratory study that aimed to better understand the consideration of carbon within the procurement process. As a preliminary and exploratory study, Cycle One's principal contribution was that it confirmed various findings from existing literature. Cycle One examined multiple sectors and identified that SMEs appeared to have a weak understanding of LCP, which supports Walker and Preuss' (2008) research on public sector procurement from small businesses in the UK. Cycle One outlined that the public sector tended to be the strongest in relation to the practice of LCP. Cycle One also contributed to the literature to outline where and how carbon tends to be considered in procurement processes. LCP implementation predominately takes place within the high value procurement process in the public sector, which supports the work of Walker and Brammer into SPP (2009). The public sector in Wales has a structured process for high value procurement and adopts a procurement policy centred around sustainability that involves the use of procurement tools, which cover carbon. LCP is implemented through procurement tools which are completed at different stages of the procurement process to support LCP. During this method, carbon considerations and low carbon requirements are expected to filter through the process. Resultantly, the preparation of the procurement and supporting documents are well-thought out, through to the end of procurement process, into the product or service procured. Tools were highlighted as important for shaping LCP implementation within the public sector. This finding supports the work of Diofazi and Valko (2014) and Testa et al. (2012), who both refer to the use of procurement policy tools. Cycle One revealed the significance of certification for enabling LCP within the public sector, a point which is rarely noted in SPP literature (see Walker and Brammer 2009; Testa et al. 2016) and has potentially been overlooked. Cycle One overall, in its capacity as a preliminary study, reinforced the importance of LCP within the public sector and provided confirmatory evidence for several aspects of LCP, particularly as it pertains to the public sector.

Cycle Two

Cycle Two addressed RQ2 and RQ3 which examined the drivers, enablers and barriers of LCP from a multi-level (3 levels) perspective to explore how they operate and interact, and, in turn, make a contribution to extant SPP literature. The review of the SPP literature revealed that there were only six papers explicitly adopting and applying theories: Borg et al. (2006) adopted Institutional theory (IT); Smith and Fernandez (2017) adopted representative Bureaucracy; Gelderman et al. (2015) and Rehmatulla et al. (2017) adopted Agency Theory; Meehan et al. (2017) adopted the Resource-Based View (RBV); whilst Gelderman et al. (2017) adopted Stakeholder theory. Consequently, a total of five theories have been used individually within the SPP literature.

The two key theoretical contributions emerging out of Cycle Two concern (a) the applicability of IT as a primary lens and RBV as a secondary lens framing the dataset, which aided the exploration of the key drivers, enablers and barriers to the implementation of LCP and (b) the identification of the contextual dynamics and interplay between themes and concepts during the implementation of LCP in the public sector through recourse to a multi-level analysis.

Institutional Theory

This research contributed to extant SPP literature as a consequence of its use of Institutional theory (IT) as the primary theoretical frame, which was applied through multi-level analysis to all three pillars of IT operating during the implementation of LCP, namely, regulative, normative and cognitive. This highlighted the limitations of relying solely on IT as a theoretical lens through which to understand LCP, in that it did not accommodate all the major factors because *'costs'* and *'resources'* were deemed to be major barriers at the Meso level. The integration of the RBV provided an additional theoretical lens through which to observe the importance of *'resources'* and their impact on LCP, which assisted the interpretation of the findings (see. Barney 1991; Wernerfelt 1984). RBV has recently been used in SPP (see Meehan et al. 2017), and in this study its application complemented IT at the Meso level through its capacity to recognise factors such as *'knowledge'*, *'budgets'* and *'human resources'*. After having '*systematised*' the data, the author was then in a better position to be able to understand LCP in the public sector in a more abstract sense. The combined use of IT and RBV, although novel in SPP, proved beneficial in terms of understanding the contextual landscape of LCP. Such a combined use of IT and RBV has been successfully applied outside the field of SPP; for example, Wang et al. (2012) recognised that

the boundaries between RBV and IT overlap, and, as such, can be applied in a complementary and interdependent way in the international business context, which correlates with the findings in this study. By integrating IT with RBV, the author was thus able to identify the key themes and concepts in the data, which represents a novel contribution to extant literature on SPP and LCP.

The study also contributes to our understanding of how IT can help us understand transition and alignment, legitimacy, and institutional entrepreneurship. Although *'legislation'* was identified as a Macro level driver, the *'lack of alignment'* in these regulatory pressures constitutes a major barrier on the Macro level, whilst, simultaneously, permeating negatively through all the levels. Indeed, *'lack of alignment'* was recognised by most GA participants as a hindrance to LCP. This finding expands upon the work of Walker and Brammer (2009) who recognised *''aligned with organisational goals'* as an enabler, however, they did not report a *'lack of alignment'* as being a barrier (representing the other side of the coin). This study recognises the importance of alignment, within the framework of IT, insofar as it enables effective implementation to take place. This study thus contributes to the literature by recognising that '*lack of alignment'* in the public sector constitutes a major barrier, and, as such, if one seeks to facilitate and promote LCP, *'alignment'* is required.

The study makes a small contribution to IT because it identified resistance to regulatory pressures. To appear legitimate in the face of institutional pressures, some procurers would outwardly portray adherence whilst in reality they were covertly resisting via *'tick-box'* orientated activities. This is in accordance with the work of Oliver (1991), who outlined five forms of resistance to institutional pressure. The study has additionally provided insight into the justifications for this behaviour, such as a lack of knowledge, resources and complex tools. This finding thus supports and reinforces the work of Meehan et al. (2015), who discussed and sought to explain such legitimised forms of resistance.

Institutional entrepreneurship is identified within this study for the first time in SPP literature as being a significant driver and enabler. Institutional entrepreneurs can refer to organisations or groups of organisations (Garud et al. 2002; Greenwood et al. 2002), or individuals or groups of individuals (Fligstein 1997; Maguire et al. 2004). In this study, it was identified that institutional entrepreneurship was prevalent within the public sector on all three levels. The author recognised two participants (GB) as *'institutional entrepreneurs'* due

to the valuable contributions they made to their respective organisations and within the public sector. Recognising the importance of institutional entrepreneurs marks a significant contribution in light of the important role they were found to play in helping to promote and implement LCP.

Multi-level

Some of the findings are broadly in keeping with those of Walker and Brammer (2009) and Brammer and Walker (2011), who researched the facilitators and barriers of SPP and reported that the major barriers to SPP were *'cost/price'*, *'awareness'*, and *'lack of resources'*, which coincide with the findings of this thesis. However, Walker and Brammer (2009) and Brammer and Walker (2011) adopted a one-dimensional, list-style approach in their reporting on these facilitators and barriers. Out of the whole SLR data set, only one paper adopted a two-level perceptive (Preuss and Walker 2011), whilst only two papers adopted a three-level respective (Guenther et al. 2013; Trindade et al. 2017). Consequently, the previous literature also lacks a deeper discussion or analysis of the interaction between the drivers, enablers and barriers at various levels. A unique contribution of this thesis pertains to its multi-level presentation of the findings (Cycle Two). Presenting these findings across multi-levels was original and involved a degree of risk-taking due to the fact that research of this kind was scarce in the field of SPP. This three-level perspective afforded an overview of the entire sector and allowed for the opportunity to draw links between drivers, enablers and barriers through the idea of *'symptoms'* or *'causes'*. In so doing, this study expands upon the findings of Walker and Brammer (2009) and extends the work of existing multi-level papers by conducting investigative research on multiple levels to identify the major drivers, enablers and barriers, and further contributes to the field by outlining how they interact within and between levels.

By carrying out this research, the author was able to better identify the causal relationships, understand the dynamics at play, and consider the interconnectivity and the overall complexity involved in the '*phenomenon*' (LCP in the public sector) in ways that had hitherto not been explored and explained theoretically in extant SPP literature. The empirical analysis presented in this study involved merging and extrapolating the data to create conceptual models and digestible tables in an attempt to disentangle the complexity involved. The presentation of the data in this format identified LCP, within the public sector, in a more abstract way whilst, simultaneously, recognising the interplay between the themes and

concepts over the three distinct levels e.g. '*lack of alignment'* (Macro), *'uncertainty'* (Meso) which resulted in a *'lack of motivation'* (Micro). The collation and presentation of the research data in this format represents a novel contribution to the field, in terms of demonstrating the complexities of LCP in the public sector. This research also contributes to the literature by making detailed connections between the drivers, enablers and barriers, between and across levels in an integrated model, along through detailed scenarios, which expand the boundaries of current knowledge.

Other contributions

This study further contributed to the literature by outlining the potential contribution of transformational leadership in LCP. This is a recent focus in the field of SPP and supports the work of Chiarini and Vogoni (2016) and Grandia et al. (2015b) who have recently discussed the importance of transformational leadership as a driver. A further minor contribution concerns the first identification within the literature of public service motivation within LCP as being a significant factor. The general proposition of public service motivation derives from the belief that public administrators are drawn to public service primarily because of the desire to serve others (Perry and Hondeghem 2008). Consequently, to fully understand LCP within the public sector, appreciation must be paid in the literature to public service motivation and its potential role during the implementation of LCP.

Cycle Three

Cycle three makes a unique contribution to the SPP literature by virtue of its focus on practical interventions. Action research and intervention-based studies are largely omitted in the SLR dataset. Informed by the learning from Cycle Two, Cycle Three explored how a practical intervention (i.e. interactive workshop) can enable the transition towards the effective implementation of LCP. The cycle comprised research with NHS Wales who are a major buyer in the public sector and considered to be advanced in the area of SPP compared to other public sector organisations. The cycle marked the first notable contribution to the literature by going beyond reporting on the field to instead engaging with and promoting the potential changes to key organisations within the field to advance the effective implementation of LCP. The findings not only contribute to the field by outlining the short-term impact of an intervention, but also reported on the mid-term effect of the intervention, thus providing a more longitudinal perspective on implementation. Due to the boundaries and constraints of a PhD, researching the long-term impact of the intervention was simply not possible. Having said this, Cycle Three nevertheless made a contribution to the literature

by outlining how interventions can enable effective implementation of LCP in the short- and mid-term. This positive effect can also be hampered/limited by other factors, including austerity and the interplay between factors. This further outlines the need for additional multi-level research and future research that compares the impact of multiple forms of practical interventions and engagement to enable the transition towards the effective implementation of LCP.

In summary, the study represents an original contribution to the field of LCP literature by providing an incremental extension of knowledge and addressing the lacunae in extant SPP literature pertaining to the failure to contextualise the dynamics and complexity of LCP within the public sector. This study, by focussing on LCP in the public sector and adopting a multi-level analysis to the explanation of LCP, presents its findings through the use of conceptual models which are potentially translatable to audiences in business, academia, as well as practitioners. Overall, the empirical findings have shown that by understanding the themes and concepts emerging from Cycle Two (positive and negative) at various levels of analyses, a better understanding can be formed of how they operate and interact, which is important for the implementation of LCP. Moreover, the findings have shown how in practice forms of interventions can henceforth remove/reduce barriers, whilst, simultaneously, enhancing enablers and enlisting drivers to facilitate LCP for short-term and mid-term results with public sector procurers to enable the transition towards the effective implementation of LCP.

8.3.2 Methodological Contributions – Action Research

This thesis applied an AR strategy, inspired by Knight et al. (2016), to provide a novel contribution to SPP literature. In light of the author's philosophical stance, and to fill a lacuna in extant SPP literature, the choice was made to utilise AR within the research study. The use of AR, a relatively under-used research strategy in the field of SPP, represented a unique contribution to the field insofar as it pushed boundaries and laid the foundation for future researchers to understand its value and challenges respectively**.** This section will provide a reflection of the value of using AR, challenges that come with using AR, the output and impact of AR in this study.

SPP literature is dominated by contributions from traditional method (e.g. survey, case study). Using AR provided the opportunity of not just taking note of findings like other methods (e.g. survey and case study) but going on to explore further and make real change. AR, longitudinal, participatory and flexible in nature (Reason and Bradbury 2008) allowed the research to evolved organically through time and focus which other approach would not have. The fluidity and cycles allowed the research to use multiple data collection methods, according to the need of the cycle. The AR, participatory in its nature allowed the research to work with industry and academics, bridging together the needs and interests of both worlds. AR provides the researcher a unique opportunity to make contribution at policy level to the future of Wales. Additionally, the approach allowed engaging with a diverse range of individuals and groups in relation to LCP. The AR approach used, provided novel insights into participants' experiences across various organisations and agencies operating in and around the public sector at different levels, in contrast to prior research (see. Walker and Brammer 2009, Testa et al. 2012) which hitherto focused on conducting surveys with only procurement officials. This enabled researching the transition to LCP practices as embedded in the social system and an understanding of the structural and agentic factors at play in this transition. These factors together have allowed the research to provide deep insights into the implementation of LCP, within SPP literature.

Applying methods from AR was not without its challenges. Terms such as *'messy'* and *'uncertain'* (McNiff and Whitemead, (2011: 35) are reflective of the kinds of dilemmas faced by the author throughout the research, this was experienced through different parts of the research. For example, during the collection of data as AR is fluid it was hard to identify and set boundaries to the research study. An example being the dilemma faced when deciding whether to add Cycle Three, a cycle of inquiry, which may not have existed without the

flexibility of AR. McNiff (2013) argues that a key feature of AR is *'change'*; embracing this ethos, the author adopted a pragmatic approach and applied *'change making'* (Reason and Bradbury 2008) ideas which allowed for changes to be made in the research as and when they were required. Such bold mid-research deviations are encouraged within AR. However, this also was an indication of skills that are needed to execute AR effectively (Reason and Bradbury 2008). These are skills the researcher has developed through the research experience. There were moments of struggle in practice, being so close to research setting it can become hard to understand the boundaries that need to be placed. As a result, the researcher on a regular basis would discuss the practical and academic needs and constraints with the supervisory team to attain the focus of a PhD thesis. Overall, the application of AR broadened the ambit of current SPP literature to highlight the applicability and allows fellow researchers to understand the strengths and limitations of AR methods.

Outputs and impact

Using AR provided the opportunity to make a wide range of contributions. This research contributes directly to a number of key outputs and areas of impact made by each cycle in Wales, which are presented below.

Outputs include:

- White Paper to WAG in March 2016: *"Thinking about the future: The consideration of carbon within the procurement process in Wales"* (Begum et al. 2016a). Available in the public domain through the CCCW official website.
- Competitive Conference Paper presented at International Purchasing & Supply Education & Research Association (IPSERA) Conference (March 2016): *'Stakeholder Engagement and sensemaking in pursuit of reducing carbon emissions through procurement'* (Begum et al. 2016b).
- Official 'shared learning' event, held in Cardiff Business School (February 2016) to present research findings with participants and industry officials from three sectors and build consensus.
- Practical intervention and engagement through workshops with NHS Wales to enable transition towards effective implementation of LCP.

Table 8.2. Impact of research

Cycle	Impact overview
One	• WAG funding (undisclosed figure) and support arrangements made to support SMEs with knowledge transfer and obtaining EMS certifications. This was partly due to the findings presented to CCCW at the end of Cycle One. • Cycle One finding were presented to CCCW and CPT during November 2015. Researcher met with CPT representative during November 2015 and March 2016 to discuss potential policy changes needed. CPT confirmed that a review of policy tools would be conducted, and changes would be made to factor carbon into the procurement process based partly on the findings from Cycle One.
Two	• The ongoing research being carried out by the author during Cycle Two was publicised after the author won *'Young Professional of the Year'* at the Welsh National Procurement Awards on 10 June 2016 for contribution to Wales (Institute for Competition and Procurement Studies, 2016). • A meeting with Policy officer at FGCO took place where Cycle Two findings were presented and including a discussion around leadership for effective implementation of LCP. The Policy Officer informed transformational leadership will be planned as part of FGC long-term goals and ambitions. • Informed by CPT, changes have taken place with the Community Benefit tool; reduction to the threshold and introduction of a new 'Good and Services' Community Benefits tool following this cycle. • Following Cycle Two there was there interest from public sector organisations to collaborate in further research. This led to Cycle Three workshops being conducted with NHS Wales.
Three	• Intervention and engagement through workshops took place to enable transition toward effective implementation of LCP. Procurers following the workshops had a better understanding of LCP. This enabled them to effectively implement LCP. • Cycle Three reported positive short-term and mid-term changes, enabling the transition towards the effective implementation of LCP.

8.3.3 Contributions to practice and policy

On a practical level, the research provides insights for policymakers and practitioners:

- It highlights the benefits that can be achieved through collective working across multiple-levels. The research, which promoted collaboration and partnership, brought together two groups, GA and GB, from distinct levels (Macro and Meso), and encouraged the need for discourse between individuals that work on policy and those who operate with the policies.
- The study provided scenarios along with propositions for policymakers and LCP practitioners to facilitator and promote LCP in the public sector.

- The study highlights the need for alignment between legalisation, policy and structures in the public sector for effective implementation of LCP.
- The study outlined the alignment, resources and processes aspects that are too often taken for granted and emphasised that the links between them must be addressed in practice and at a policymaking level for LCP to be effective.
- The study has evidenced that during a period of austerity, that short-term withdrawal of LCP activity is one of the first areas to be cut. It also highlighted austerity leads to uncertainty and lowers the motivation for enabling and driving SPP and its related aspects.
- Adopting an AR strategy demonstrates that even during such periods of uncertainty, practical interventions (e.g. interactive workshops) can enable the transition to effective implementation of LCP.
- The findings also confirmed that formal institutional barriers still presented a significant hurdle which are difficult to overcome. Primarily, the research found that communication and interventions are vital for the transition to effective implementation of LCP within the public sector.
- The findings highlight that, for LCP to be effective, long-term policy planning is required including structural changes, such as budget allocation, alignment (. e.g. legislation and policy) and resources (. e.g. training, knowledge and skills to be built).

8.4 Research challenges

Despite the valuable data collected during the three cycles of enquiry, the research was not without its practical difficulties. Some of the challenges faced by the author at different phases over the research include:

8.4.1 Access

At the outset (Cycle One) access was not that straightforward, and multiple calls and emails were made with no response. Over time, access became easier, with participants encouraging and referring others (via snow-balling). In Cycle Two, over-subscription became an issue and the participant pool had to be closed to manage the data and the scale of the research given the time and resource constraints. Other hurdles experienced stemmed from the timing of the research, which sometimes clashed with sector changes. For example, there were periods (February-May 2016) in which access was reduced due to restructuring within the CCCW and the re-budgeting periods (September-November 2016) in the NHS Wales.

8.4.2 Transparency and disclosure

During the research, full disclosure was not always forthcoming. Conducting research on procurement, financial disclosure (i.e. overall spend) was naturally a starting point for some of the conversations. However, despite gaining ethical approval and providing disclosure agreements to all participants, obtaining this financial information in some cases proved impossible as organisations were reluctant to share data which they felt was too sensitive or could be perceived of negatively if published.

An altogether more surprising hurdle to overcome was the over-sharing of data which sometimes became a hindrance and distraction in the research. It seemed that the sharing of excessive volumes of reports and documents with largely irrelevant material was, at times, an attempt to divert attention away from the requested material and financial disclosures. There were further challenges when research findings had to be disclosed as these had to be scrutinised and approved by legal departments or senior management. This internal scrutiny was expected to some extent, it nevertheless took up considerable time awaiting consent, accessing further data and waiting for approval to publish often took months, which at times hampered the research progress.

8.4.3 Scale and evolution of research

The pragmatic approach to AR was a positive feature of the research, but equally presented significant challenges when conducting research in a fast-moving environment where changes to policy and practice were constant. The risk of deviating from the intended research and getting lost in practical events made prioritising and decision-making important. Reflections on these ongoing dilemmas have been expressed in the research diary entries. Having originally planned Cycle One and Cycle Two, the need for Cycle Three arose directly out of the findings from Cycle Two. At the time, this extension presented a dilemma around whether to conclude the research phase and commence the analysis phase, or whether to pursue the Cycle Three line of inquiry, which presented a unique opportunity to probe deeper and engage with and potentially influence changes in practices towards LCP. In hindsight, this decision was the correct one; however, its inclusion did result in more data to analyse. It is noteworthy to mention that an opportunity for further research did present itself after Cycle Three was completed. However, a firm decision was taken to close the research phase and focus on the analysis process and the next step of analysing data. This is reflective of the practical resources, funding issues and time constraints faced by the author in conducting research within the parameters of PhD research. In the event that further

research had been conducted after Cycle Three, it is almost certain that this would have rendered the thesis submission deadline impossible. However, it does provide avenues for future research and publications.

8.5 Avenues for publication

Reviewing the thesis, there are a number of avenues for publications. Some chapters and research questions themselves provide structures for journal articles, three of which are listed in Table 8.3.

Table 8.3. Publication avenues

	Focus	Description	Journals & Timescales
1	SLR of SPP	Chapter Four contains, to the best of the author's knowledge, the first SLR of SPP. An opportunity exists to publish a SLR and offer a unique contribution to the existing body of literature. The benefit of such a publication is that it would unify all the relevant SPP literature in a single document.	Journal of Cleaner Production (6-12 months)
2	Implementation of LCP (drivers, enablers and barriers)	Scope exists for publication of Cycle Two research findings looking at the implementation of LCP within the public sector. Correia et al. (2013) reported that LCP is a growing area and called for more papers to be published in this area. More recently, Cheng et al. (2018) identified the need for publications on concepts such as 'emission' 'reduction' 'practice' and 'policy'. Publication of these findings would answer this call.	Journal of purchasing and supply management. (6-18 months)
3	Interventions, making changes and impact though an AR strategy	SPP literature looks predominately at drivers, enablers and barriers, but does not go further to attempt to intervene to make change. Findings from Cycle Three could provide novel insights into interventions, engagement, and change making. A publication could also incorporate the use of AR to achieve this change. The experiences and process of using AR further provides an opportunity to produce a paper on undertaking and considering the use of AR in SPP.	Journal of purchasing and supply management (6-12 months)

8.6 Limitations and boundaries of the study

There is a need to understand the limitations and boundaries of any piece of research. The following caveats should be considered when interpreting the findings emerging out of this research. This research is primarily concerned with LCP in the public sector and is connected to extant literature on SPP. Specifically, the study looks at the implementation of LCP by exploring the drivers, enablers and barriers towards change. The research sought to investigate this relatively unexplored set of issues and provide rich empirical data, which hitherto had not been conducted within the body of LCP literature. The author accepts that the findings may not be directly applicable to the broad fields of SPP or GPP, given that LCP is a niche branch of these distinct disciplines of procurement. The relevance of the findings to the private and third sector are also yet to be determined. Moreover, the research was based in Wales, a location where SD has been embedded into the constitution. Whilst this provides opportunities for learning, it does not necessarily mean that the findings would translate neatly into other settings that have a different relationship between policy-making and SD. These findings therefore do not claim to reflect the findings of other countries, nor does it exclude the idea that similarities may exist in other countries or regions given the scale of this growing area. The data collection process also has its limitations which were identified during Cycle Two, when initial participant numbers were low there was a need to adopt a *'snowballing'* approach to recruiting participants. Snowballing has its advantages and disadvantages (Saunders et al. 2012). The research should thus be viewed with this in mind, although it is also important to note that under the current economic climate of *'austerity'* in the public sector, the snowballing recruitment approach aided the research. Furthermore, although this study is insightful, it is important to reiterate that it does not incorporate suppliers. Of course, this is not to say that suppliers would not also be influenced by the findings of this research, but, rather, it places a boundary around the contribution that is being made. The research concluded with Cycle Three, which explored mid-range change. Long-term change was not examined because this was simply outside the scope of PhD research.

8.7 Recommendations for future research

The thesis concludes by considering potential avenues for future research, which could expand upon the findings of this study and make an even greater contribution to the scarce literature available on LCP within the public sector and SPP. Within the field of SPP literature, LCP is an emergent concept (Correia et al. 2013) and provides an avenue through which to make a significant contribution. The recent Cheng et al. (2018) literature review on GPP identified the need for more publications on concepts such as *'emission'*, *'reduction',* *'practice'* and *'policy'*.

Future research into LCP could also focus on the drivers, enablers and barriers identified in this study, but in other contexts, such as, for example, different regions, countries and sectors (private and third, for example), which would allow for comparisons to be drawn and more detailed conclusions to be reached. Moreover, there exists considerable scope to evaluate the impact of devolution and the impact of more recent Welsh sustainability legislation, such as the EA Act and the WBFG Act on future prospects for LCP. These legislative drivers appear to have propelled Wales ahead of England with respect to sustainability legalisation and policy, and thus it would be valuable to conduct a comparative review to assess the impact of a progressive region or nation.

At present the Welsh public sector is facing considerable resource constraints and undergoing a process of transition (the appointment of a new FG Commissioner and the enactment of recent sustainability driven legislation). Re-examining the Welsh context in the aftermath of this period of austerity and transition represents another potentially interesting avenue for comparative future research. Opportunities also exist to research the impact of LCP over the next few years during the UK's planned departure from the EU, as a direct result of 'Brexit' (the EU Referendum 2016). At present, the UK has yet to confirm whether it intends to repeal the European Communities Act 1972 (the Act which makes EU Public Procurement Directives legally binding in the UK) or whether these Directives will continue to exist in some form or another. Consequently, there is scope to conduct comparative studies of LCP both pre- and post-Brexit.

Equally, in-depth investigation of how SPP, GPP and LCP implementation (i.e. drivers, barriers and enablers) are similar and different could also be explored in future research. Future research could examine more deeply the drivers, enablers and/or barriers that were identified in this study to explore the complex interactions between factors that in the SPP

literature tend to be treated as separate factors. There is potential value in exploring these factors in terms of the connections and influences they have on each other at different levels. Alongside this, future research could analyse these drivers, enabler and barriers through recourse to other methodologies, such as in-depth case studies or more longitudinal action-oriented studies, for example.

Part of the value of this study stemmed from the fact that it combined theoretical lenses (IT and RBV) to conduct multi-level research. Consequently, the author recommends that future research also adopt a multi-level perspective and utilises multiple theories to explore the relationships between the different factors (i.e. drivers, enablers and barriers) and levels. There are opportunities for future researchers to integrate additional theoretical lenses (i.e. the five theories presented in SPP literature) or even introduce different combinations. This would also provide an opportunity to explore the theoretical lens and, in turn, contribute to the much-needed theoretical papers in SPP literature.

The findings of this research could form the basis for future research into the identification and exploration of different interventions, to enable the transition towards the effective implementation of LCP on a medium- to long-term scale, thus moving beyond the constraints imposed via the parameters of a PhD. This will enable understanding their effectiveness during the implementation of LCP.

A final interesting avenue for research is to examine the impact upon SPP and its sub-disciplines, i.e. LCP and GPP, in the aftermath of the United States' withdrawal from the Paris Agreement on Climate Change on 1st June 2017. To bring this thesis to a close, the author has chosen to cite a specific reflection from the research diary.

Final Reflections: Climate change and carbon

May 2018

As I come to the end of my journey, I feel privileged to have been involved in climate change and the carbon agenda, which has such importance on a national and international level. It is quite rare that a topic has such universal appeal, and the potential to unite most of the world's nations. This is a topic where even countries who are at war with one another have come together via the UN for the common goal of tackling climate change and reducing carbon emissions. It is rare that a political topic brings together the UN and leaders of nations, including Theresa May, Angela Merkel, along with religious figures such as the Pope, Dalai Lama, leading members of industry, such as Bill Gates, Elon Musk, movie stars such as Leonardo Dicaprio and Arnold Schwarzenegger, broadcaster and naturalist Sir David Attenborough, and the late Stephen Hawkins to name only a few.

Hopefully, this united consensus and international initiatives and policies such as Kyoto targets and Paris Agreement can help to reduce climate change incrementally by 2050.

Although carbon may seem like an invisible entity, the danger of apathy becomes much more real as the years go by. As Ken once said to me early on in the PhD, there is no such thing as the environmental 'problem', and over time I began to realise that the problem is us, in terms of our expectations and demands that we place on the environment. Our relationship with the environment is undoubtedly complex, but however complex the problem may be, the task of solving it lies in our hands, and, the generation to come, are expecting us as a generation to stand up. We have a say about how things are done. Yes, we may be one person, but collectively we are a nation, a society, the human race. The agenda is far greater than one's own life expectancy, and thus it is important that we all take action. My research into LCP represents my own small contribution. As I conclude this thesis, I want to end with a poignant quote from the former Secretary General Ban Ki-moon of the UN, made during Climate Week in New York City in 2014:

"If we can't all swim together we will sink. There is no plan B, because there is not planet B."

Ban Ki-moon,
(Secretary General UN)

References

Aether and Ricardo-Aea. 2015. *Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2013.* [Online]. Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat07/DA_GHGI_1990 2013_Report_v1.pdf [Accessed 01 December 2016]

Afonso, A., Schuknecht, L., and Tanzi, V. 2005. Public sector efficiency: An international comparison. *Public Choice* 123(3-4), pp.321-347.

Age, L.J., and Gustavsson, B. 2016. The art of discovering – experiences of novice researchers. *Qualitative Research Journal* 16(2), pp.125-137.

Ahsan, K., and Rahman, S. 2017. Green public procurement implementation challenges in Australian public healthcare sector. *Journal of Cleaner Production* 152, pp.181-197.

Ainger, K. 2002. Earth Summit for sale. *New Internationalist* 347, pp.20–22.

Akenroye, T.O. 2013. An appraisal of the use of social criteria in public procurement in Nigeria. *Journal of Public Procurement* 13(3), pp.364-397.

Akenroye, T.O., Oyegoke, A.S., and Eyo, A.B. 2013. Development of a framework for the implementation of green public procurement in Nigeria. *International Journal of Procurement Management* 6(1), pp.1-23.

Aldenius, M., and Khan, J. 2017. Strategic use of green public procurement in the bus sector: Challenges and opportunities. *Journal of Cleaner Production* 164, pp.250-257.

Alexander, A., Walker, H., and Naim, M. 2014. Decision theory in sustainable supply chain management: a literature review. *Supply Chain Management: An International Journal* 19(5/6), pp.504-522.

Altheide, D.L., and Johnson, J.M. 1994. Criteria for assessing interpretive validity in qualitative research. In: Denzin, N.K. and Lincoln, Y.S. eds. *Handbook of qualitative research*. Thousand Oaks, CA: Sage, pp. 485-499.

Alvesson, M., and Kärreman, D.A.N. 2007. Constructing mystery: empirical matters in theory development. *Academy of Management Review* 32(4), pp.1265-1281.

Amis, J., Slack, T., and Hinings, C.R. 2004. The pace, sequence, and linearity of radical change. *Academy of Management Journal* 47(1), pp.15–39.

Amann, M., Roehrich J.K., Eßig M., and Harland C. 2014. Driving sustainable supply chain management in the public sector: The importance of public procurement in the European Union. *Supply Chain Management: An International Journal* 19(3), pp.351-366.

Amundson, S.D. 1998. Relationships between theory-driven empirical research in operations management and other disciplines. *Journal of Operations Management* 16(4), pp.341-359.

Andriessen, D. 2004. *Making Sense of Intellectual Capital: Designing a Method for the Valuation of Intangibles.* Elsevier Butterworth-Heinemann: Burlington.

ANPED, CEEweb for Biodiversity, and Ecologistas en Acción. 2012. Capping resource use proposal for a reduction of non-renewable energy use within the EU. Cap Coalition: Budapest.

Arndt, H. W. 1981. Economic development: a semantic history. *Economic Development and Cultural Change* 29(3), pp.457-466.

Aschhoff, B. and Sofka, W. 2008. Innovation on demand – can public procurement drive market success of innovations? *Research Policy* 38(3), pp.1235-1247.

Ashworth, R., Boyne, G., and Delbridge, R. 2009. Escape from the iron cage? Organizational change and isomorphic pressures in the public sector. *Journal of Public Administration Research & Theory* 19(1), pp.165-187.

Asselt, H.V., Grijp, N.V.D., and Oosterhuis, F. 2006. Greener public purchasing: Opportunities for climate-friendly government procurement under WTO and EU rules. *Climate Policy* 6(2), pp.217-229.

Assembly Wales. 2015. *Well-being of Future Generations (Wales) Bill.* [Online] Available at: http://www.senedd.assembly.wales/documents/s37945/Well-being%20of%20Future%20Generations%20Wales%20Bill,%20as%20passed.pdf [Accessed 28 October 2015].

Ayers, J., and Dodman, D. 2010. Climate change adaptation and development: The state of the debate. *Progress in Development Studies* 10(2), pp.161-68.

Aziz, S.A., Jaafar, M.R., Ramli, N.M. 2016. The roles of compliance with government procurement policy: Moderating the effects between explanatory factors and sustainable public procurement practice. *Jurnal Pengurusan (UKM Journal of Management)* 48, pp.89-98.

Bacharach, S.B. 1989. Organizational theories: some criteria for evaluation. *Academy of Management Review* 14(4), pp.496-515.

Baily, P., Farmer, D., Crocker, B., Jessop, D., Jones, D. 2015. *Procurement, principles and management*. 18th Ed. Harlow, UK: Pearson Education.

Bala, A., Munoz, P., Rieradevall, J., and Ysern, P. 2008. Experiences with greening suppliers. The universitat autonoma de Barcelona. *Journal of Cleaner Production* 16(15), pp.1610–1619.

Baldwin, A. 2014. *Putting the philosophy into PhD.* Working Papers in the Health Sciences 1(10), pp.1-4.

Barbier, E.B. 1987. The concept of sustainable economic development. *Environmental Conservation* 14(2), pp.101-110.

Barney, J.B. 1991. Firm resources and sustained competitive advantage. *Journal of Management* 17(1), pp.99-120.

Barney, J.B. 2001. Is the Resource-Based "View" a Useful Perspective for Strategic Management Research? *Academy of Management Review* 26(1), p.101.

Bartelmus, P. 1986. *Environment and development.* London: Allen and Unwin.

Bass, B. M., and Riggio, R. E. 2006. *Transformational leadership.* Mahwah: Erlbaum.

Battilana, J. 2006. Agency and institutions: The enabling role of individuals' social position. *Organization, 13*(5), 653–676.

Battilana, J., Leca, B., and Boxendum, E. 2009. How actors change institutions: Towards a theory of institutional entrepreneurship. *The Academy of Management Annals* 3(1), pp.65-107.

BBC. 2008. *The 20th Century.* [Online]. Available at: http://www.bbc.co.uk/wales/history/sites/themes/society/industry_coal03.shtml [Accessed 15 August 2017].
BBC. 2014. Value Wales. [Online]. Available at: http://gov.wales/topics/improvingservices/bettervfm/?lang=en [Accessed 05 December 2016].

BBC. 2016. *Tata Port Talbot steelworks closure 'could hit 15,000 jobs.* [Online]. Available at: http://www.bbc.co.uk/news/uk-wales-35930158 [Accessed 25 August 2017].

Beatty, C., Fothergill, S., and Powell, R. 2007. Twenty years on: has the economy of the UK coalfields recovered? Environment and Planning A 39, pp.1654-1675.

Becker, E., Jahn, J., and Stiess, I. 1999. *Exploring uncommon ground: sustainability and the social sciences*. In: Becker, E. and Jahn, T. ed. *Sustainability and the social sciences: A cross-disciplinary approach to integrating environmental considerations into theoretical reorientation* New York, New York: Zed Books, pp. 1– 22.

Begum, H., Touboulic, A., and Walker, H. 2016a. *Thinking about the future: The consideration of carbon within procurement process in Wales*. [Online] Available at http://www.thecccw.org.uk/wp-content/uploads/2016/03/CCCW-Carbon-Procurement-Full-Report.pdf [Accessed 15 July 2017]

Begum, H., Touboulic, A., and Walker, H. 2016b. Stakeholder engagement and sensemaking in pursuit of reducing. 25th *IPSERA Conference, April 2015,* Dortmund: Germany.

Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., and Courchamp, F. 2012. Impacts of climate change on the future of biodiversity. *Ecology Letters* 15, pp.365–377

Berdichevsky, N. 2004. *Nations, language and citizenship*. London: McFarland and Company.

Berke, P.R., and Conroy, M.M. 2000. Are We Planning for Sustainable Development? An Evaluation of 30 Comprehensive Plans. *Journal of the American Planning Association* 66, pp.21-33.

Björn, J. 1992. Institutional learning. In: Lundvall, B-A. ed. *National systems of innovation. towards a theory of innovation and interactive learning*. London: Pinter Publishers, pp.23-24.

Blair, R. 2006. PM's comments at lanuch of Stern Review. [Online]. Available at: http://www.number-10.gov.uk/output/> [Accessed 15 June 2015].

Borg, N., Blume, Y., Thomas S., Irrek, W., Faninger-Lund, H., Lund, P., and Pindar, A. 2006. Release the power of the public purse. *Energy Policy* 34(2), pp.238-250.

Bolton, P. 2008. Protecting the environment through public procurement: The case of South Africa. *Natural Resources Forum* 32, pp.1–10.

BP Statistical Review of World Energy 2016. [Online]. Available at: https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf [Accessed 20 March 2015].

Brammer, S., and Walker, H. 2011. Sustainable procurement in the public sector: An international comparative study. *International Journal of Operations and Production Management* 31(4), pp.452-476.

Brander, L., Olsthoorn, X., Oosterhuis, F., Fuhr, V. 2003. Triggering innovation. In: Erdmenger, C. ed. *Buying into the environment: Experiences, opportunities and potential for eco-procurement.* Sheffield: Greenleaf, pp.94–113.

Bratt, C., Hallstedt, S., Robèrt, K.H., Broman, G., Oldmark, J. and 2013. Assessment of criteria development for public procurement from a strategic sustainability perspective. *Journal of Cleaner Production* 52, pp.309-316.

Briggs, M.I, and Myers, P. 1995. *Gifts Differing: Understanding Personality Type.* (Second eds). California: Davies-Black Publishing.

Brulhart, M., and Trionfetti, F. 2004. Public expenditure, international specialisation and agglomeration. *European Economic Review* 48, pp.851 –881.

Brundtland United Nations Commission. 1987. *Our Common Future*. New York: Oxford University Press.

Bryman, A., and Bell, E. 2007. *Business Research Methods*. Oxford: Oxford University Press.

Burchard-Dziubińska, M., and Jakubiec, T. 2012. Green Public Procurements (GPP) as an Instrument of Implementation of Sustainable Development. Analysis of the Experience of the Lodz Region Local Government. *Comparative Economic Research* 15(3), pp.23-36.

Burgess, K., Singh, P. and Koroglu, R. 2006. Supply chain management: a structured literature review and implications for future research. *International Journal of Operations & Production Management* 26(7), pp.703-729.

Business Wales. 2017. *Welsh Government's Sustainable Development Charter.* [Online]. Available at: https://businesswales.gov.wales/blog/news/welsh-government%E2%80%99s-sustainable-development-charter [Accessed 1 September 2017].

Cabinet Office, Efficiency and Reform Group and Crown Commercial Service. 2012. *Procurement policy note 10/12: The Public Services (Social Value) Act 2012.* [Online]. Available at: https://www.gov.uk/government/publications/procurement-policy-note-10-12-the-public-services-social-value-act-2012 [Accessed 7 July 2018].

Carlsson, L., and Waara, F. 2007. Environmental concerns in Swedish local government procurement. In: Thai, K.V. and Piga, G. eds. *Advancing public procurement: Practices, innovation and knowledge-sharing.* Boca Raton, Florida: PrAcademic Press, pp.239–256.

Carter, C. R., and Rogers, D. S. 2008. A framework of sustainable supply chain management: moving toward new theory. *International Journal of Physical Distribution & Logistics Management* 38(5), pp.360-387.

Carter, C.R. 2011. A call for theory: the maturation of the supply chain management discipline. *Journal of Supply Chain Management* 47(2), pp.3-7.

Carter, C., and Easton, P.L. 2011. Sustainable supply chain management: evolution and future directions. *International Journal of Physical Distribution & Logistics Management* 41(1), pp.46-62.

CCCW. 2016. *About Us.* [Online]. Available at: http://www.thecccw.org.uk/about [Accessed 3 June 2017].

CEC. 2008. *Public Procurement for a Better Environment.* Brussels: Commission of the European Communities.

Cerin, P. 2006. Bringing economic opportunity into line with environmental influence: A discussion on the Coase theorem and the Porter and van der Linde hypothesis. *Ecological Economics* 56, pp.209-225.

Ceschin, F., and Vezzoli, C. 2010. The role of public policy in stimulating radical environmental impact reduction in the automotive sector: The need to focus on product-service system innovation. *International Journal of Automotive Technology and Management* 10(2/3), pp.321-341.

Chalmers, A. F. 1999. *What is this thing called science?* (3rd ed.). St. Lucia, Australia: University of Queensland Press.

Cheng, W., Appolloni, A., D'Amato, A., Zhu, Q. 2018. Green Public Procurement, missing concepts and future trends – A critical review. *Journal of Cleaner Production* 176, pp.770-784.

Chiarini A., and Vagnoni E. 2016. Environmental sustainability in European public healthcare: Could it just be a matter of leadership? *Leadership in Health Services* 29(1), pp.2-8.

Chiarini, A., Opoku, A., and Vagnoni, E. 2017. Public healthcare practices and criteria for a sustainable procurement: A comparative study between UK and Italy. *Journal of Cleaner Production* 162, pp.391-399.

Chicksand, D., Watson, G., Walker, H, Radnor, Z., and Johnston, R. 2012. Theoretical perspectives in purchasing and supply chain management: an analysis of the literature. *Supply Chain Management: An International Journal* 17(4), pp.454-472.

Christen, M., and Schmidt, S. 2012. A formal framework for conceptions of sustainability – a theoretical contribution to the discourse of sustainable development. *Sustainable Development* 20(6), pp.400-410.

Clement, S. ed. 2007. The ProcuraþManual. A guide to cost-effective sustainable public procurement, 2nd ed. Freiburg: ICLEI European Secretariat.

Climate Change Act. 2008. [Online]. Available at: https://www.legislation.gov.uk/ukpga/2008/27/contents [Accessed 05 July 2015].

Climate Change Act 2008. *Chapter 37.* [Online]: Available at: http://www.legislation.gov.uk/ukpga/2008/27/introduction [Accessed 15 August 2017].

Climate Change Commission for Wales. 2015. *Greenhouse gas emissions for Wales – latest figures.* [Online]. Available at: http://www.thecccw.org.uk/greenhouse-gas-emissions-for-wales-latest-figures/ [Accessed 15 February 2017].

Climate Change Commission for Wales. 2016. *About.* [Online]. Available at: http://www.thecccw.org.uk/about/ [Accessed 05 June 2015].

Climate Change Commission for Wales. 2016. *Accelerating the Transition to a Low Carbon Economy*. [Online]. Available at: http://www.thecccw.org.uk/accelerating-the-transition-to-a-low-carbon-economy/ [Accessed 01 September 2017].

Clover, C. 2015. The environmental cost of the tomato on your plate. [Online]. Available at: https://www.telegraph.co.uk/news/uknews/1494070/The-environmental-cost-of-the-tomato-on-your-plate.html [Accessed 02 June 2017].

Cobb, J.B. 1992. *Sustainability: Economics, ecology, and justice*. New York, New York: Wipf and stock publishers.

Coggburn, J.D. 2004. Achieving managerial values through green procurement? *Public Performance & Management Review* 28(2), pp.236-258.

Cohen, M.J., and J. Murphy, eds. 2001. *Exploring Sustainable Consumption: Environmental Policy and the Social Sciences*. New York, New York: Pergamon.

Colquitt, J.A., and Zapata-Phelan, C.P. 2007. Treads in theory building and theory testing: A five-decade study of the academy of management journal. *Academy of Management Journal* 50(6), pp.1281–1303.

Climate Change Commission for Wales. 2014. Annual Report.

Committee on Climate Change. 2017. *Carbon budgets: how we monitor emissions targets.* [Online]. Available at: https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/ [Accessed 5 September 2017].

Communities and Culture Committee. 2008. *The funding of Voluntary Sector Organisation in Wales Report.* National Assembly for Wales.

Coon, D. 2017. The scandal of Orgreave. [Online]. Available at: https://www.theguardian.com/politics/2017/may/18/scandal-of-orgreave-miners-strike-hillsborough-theresa-may [Accessed 24 July 2018].

Copi, I. M., Cohen, C., Flage, D.E. 2006. *Essentials of Logic*. 2nd ed. Upper Saddle River, New Jersey: Pearson Education.

Correia, F., Howard, M., Hawkins, B., Pye, A., and Lamming, R. 2013. Low carbon procurement: An emerging agenda. *Journal of Purchasing and Supply Management* 19, pp.58–64.

Costanza, R., and Wainger, L. 1991. Ecological economics: *The science and management of sustainability.* New York, New York: Columbia University Press.

Costanza, R., Daly, H. E., and Bartholomew, J.A. 1991. Goals, agenda and policy recommendations for ecological economics. In: Costanza, R. ed. *Ecological economics: The science and management of sustainability*. New York: Columbia University Press, pp.1-20.

Crane, A., Henriques, I., Husted, B.W., Matten, D. 2016. What constitutes a theoretical contribution in the business and society field? *Business and Society* 55(6), pp.783-791.

Creed, W.E.D., Scully, M.A., and Austin, J.R. 2002. Clothes make the person? The tailoring of legitimating accounts and the social construction of identity. *Organization Science 13*(5), 475–496.

Creswell, J. W. 1994. *Research design: Qualitative and quantitative approaches.* Thousand Oaks, California: Sage Publications.

Creswell, J.W., and Miller, D.L. 2010. Determining Validity in Qualitative Inquiry. *Theory into practice* 39(3), pp.124-130.

Creswell, W. 2012. *Qualitative enquiry and research design: Choosing among five approaches.* London: Sage Publications.

Crossan, F. 2003. Research philosophy: towards an understanding. *Nurse Researcher* 11(1), pp.46-55.

Crush, J. 1995. *Power of development.* Chesham, UK: Pointing green publishing service.

Cynnal Cymru. 2015. *About CCCW*. [Online]. Available at: http://archive.cynnalcymru.com/cccw-about [Accessed 14 April 2016].

D'Aunno, T., Succi, M., and Alexander, J. 2000. The role of institutional and market forces in divergent organizational change. *Administrative Science Quarterly 45,* pp.679–703.

Daly, H.E. 1990. Towards some operational principles of sustainable development. *Ecological Economics* 2, pp.1-6.

Darnell, N., Jolley, J., and Handfield, R. 2008. Environmental management systems and green supply chain management: complements for sustainability? *Business Strategy and the Environment* 18, pp.30–45.

Dasgupta, P. 2007. Commentary: The Stern Review's Economics of Climate Change. *National Institute of Economics Review* 199(1), pp.4-7.

Davies, J. 2007. *A History of Wales.* London: Penguin Books.

Davies, J. 2014. *The Welsh Language: A History.* Cardiff: University of Wales Press.

Dawson, G.F., and Probert, E.J.D. 2007. A sustainable product needing a sustainable procurement commitment: the case of green waste in Wales. *Sustainable Development* 15(2), pp.69-82.

DECC. 2008. *Climate change act 2008. Department of Energy and Climate Change.* [Online]. Available at: http://www.decc.gov.uk/en/content/cms/legislation/cc_act_08/cc_act_08.aspxS [Accessed 15 October 2015].

Deephouse, D. L. 1996. Does Isomorphism Legitimate? *The Academy of Management Journal* 39(4), pp.1024-1039.

Defee, C.C., Williams, B., Randall, W.S. and Thomas, R. 2010. An inventory of theory in logistics and SCM research. *International Journal of Logistics Management* 21(3), pp.404-89.

Denzin, N., and Lincoln, Y. 2011. *Introduction: the discipline and practice of qualitative research*. In: Denzin, N. and Lincoln, Y. *The SAGE handbook of qualitative research*. Thousand Oaks, CA: Sage, pp1-29.

Department for Natural Resources of the Welsh Government. *Well-being of Future Generations (Wales) Act 2015: The Essentials.* [Online]. Available at: http://gov.wales/docs/dsjlg/publications/150623-guide-to-the-fg-act-en.pdf [Accessed 1 September 2017].

Department of Economic and Social Affairs (UN) 2013. *World Economic and Social Survey*. New York, New York: United Nations.

Department of Environment, Food and Rural Affairs. 2005. *The UK Government Sustainable Development Strategy.* Great Britain: Department for Environment, Food and Rural Affairs.

Dewdney, R. 1997. Results of Devolution Referendums (1979 & 1997), Research Paper 97/113. [Online]. Available at: http://researchbriefings.files.parliament.uk/documents/RP97-113/RP97-113.pdf [Accessed 01 January 2018].

Diesendorf, M. 2000. Sustainability and sustainable development. In: Dunphy, D, Benveniste, J, Griffiths, A. and Sutton, P. eds. 2000. *Sustainability: The corporate challenge of the 21st century.* Sydney: Allen and Unwin, pp.19-37.

DiMaggio, P.J., and Powell, W. 1983. The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48(2), pp.147-160.

DiMaggio, P.J. 1988. *Interest and agency in institutional theory.* In L. Zucker (Ed.), Institutional patterns and organizations. Cambridge, MA: Ballinger. pp. 3–22.

DiMaggio, P. J. 1995. Comments on "what theory is not." *Administrative Science Quarterly* 40, pp.391–397.

Diófási, O., and Valkó, L. 2014. Step by step towards mandatory green public procurement. *Periodica Polytechnica Social and Management Sciences* 22(1), pp.21-27.

Diófási-Kovács, O., and Valkó, L. 2015. Furthering sustainable development: The implementation of green procurement in Central and Eastern Europe: Methods and experiences from Hungarian public and private organizations. *Problems of Sustainable Development* 10(2), pp.115-126.

Dopson S, and Fitzgerald, L. 2005. *Knowledge to action? Evidence-based health care in context.* Oxford: Oxford University Press.

Drumwright, M.E. 1994. Socially responsible organizational buying: Environmental concern as a noneconomic buying criterion. *Journal of Marketing* 58(3), pp. 1-19.

Dyllick, T. and Hockerts, K. 2002. Beyond the business case for corporate sustainability. *Business Strategy and the Environment* 11(2), pp.130-141.

Duimering, P. R. and Safayeni, F. 1998. The role of language and formal structure in the construction and maintenance of organizational images. *International Studies of Management and Organization* 28(3), pp.57-85.

European commission. 2017. Resource Efficiency. [Online]. Available at: http://ec.europa.eu/environment/resource_efficiency/index_en.htm [Accessed 23 Dec 2017].

Edler, J. and Georghiou, L. 2007. Public procurement and innovation – resurrecting the demand side. *Research Policy* 36(7), pp.949-963.

Edquist, C., Hommen, L., and Tsipouri, L. eds. 2000. *Public Technology Procurement and Innovation*. Dordrecht, the Netherlands: Kluwer.

Eisenhardt, K. 1989. Agency theory: an assessment and review. *Academy of Management Review* 14(1), pp.57-74.

Ekins, P., and Max-Neef, M. eds. 1992. *Real-life economics: Understanding wealth creation.* London, UK: Routledge.

Elkington, J. 2002. *Cannibals with forks: The triple bottom line of 21st century business.* Oxford: Capstone Publishing Ltd.

England, R. W. 1994. Three reasons for investing now in fossil fuel conservation: Technological lock-in, institutional inertia, and oil wars. *Journal of Economic Issues* 28(3), pp.755-776.

Environmental (Wales) Act 2016. [Online]. Available at: http://www.legislation.gov.uk/anaw/2016/3/contents/enacted [Accessed 01 September 2017].

Erdmenger, C. 2003a. Public purchasing: a new, old policy tool. In: Erdmenger, C. ed. *Buying into the environment: Experiences, opportunities and potential for eco-procurement.* Sheffield: Greenleaf, pp.1–9.

Erdmenger, C. 2003b. Green purchasing: a concept lagging far behind its potential. In: Erdmenger, C. ed. *Buying into the environment: Experiences, opportunities and potential for eco-procurement.* Sheffield: Greenleaf, pp.253–257.

Erridge, A. 2007. Public procurement, public value and the Northern Ireland unemployment pilot project. *Public Administration* 85(4), pp.1023-1043.

Erridge, A., and Hennigan, S. 2012. Sustainable procurement in health and social care in Northern Ireland. *Public Money and Management* 32(5), 363-370.

European Commission. 2003a. *Integrated product policy. Communication from the Commission to the Council and the European Parliament.* COM (2003). [Online]. Available at: http://ec.europa.eu/environment/ipp./2001developments.htm [Accessed 16 June 2017]

European Commission. 2003b. *Integrated Product Policy: Building on Environmental Life-Cycle Thinking.* COM (2003) 302 final. [Online]. Available at: http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2003:0302:FIN:en:PDF [Accessed 20 June 2016].

European Commission. 2004. *Buying Green! A Handbook on Environmental Public Procurement*. [Online]. Available at: http://ec.europa.eu/environment/gpp./pdf/buying_green_handbook_en.pdf [Accessed 20 June 2014].

European Commission. 2006. *Handbook on Green Public Procurement.* Brussels: European Commission.

European Commission. 2008. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the sustainable consumption and production and sustainable industrial policy action plan. COM (2008) 397/3, Brussels.

Faber, N., Jorna, R., and Van Engelen, J. 2009. The sustainability of 'sustainability' - A study into the conceptual foundations of the notion of sustainability. Journal of Environmental Assessment Policy and Management 7(1), pp.1–33

Faith-Ell, C. 2005. The introduction of environmental requirements for trucks and construction vehicles used in road maintenance contracts in Sweden. *Corporate Social Responsibility and Environmental Management* 12, pp.62–72.

Faith-Ell, C., Balfors, B., and Folkeson, L. 2006. The application of environmental requirements in Swedish road maintenance contracts. *Journal of Cleaner Production* 14, pp.163-171.

Fee, R. 2002. Contract compliance: Subnational and European influences in Northern Ireland. *Journal of European Social Policy* 12(2), pp.107-121.

Fet, A., and Michelsen, O., and Boer, L. 2011. Green public procurement in practice - The case of Norway. *Society and Economy* 33(1), pp.183–198.

Fernandez-Martin, J.M. 1996. *The EC public procurement rules: A critical analysis studies in international trade policy*. Oxford: Clarendon Press.

Ferns, G., and Amaeshi, K. 2017. Struggles at the summits: Discourse coalitions, field boundaries, and the shifting role of business in sustainable development. *Business & Society*, p1-39.

Fink, A. 2010. *Conducting research literature reviews*. 3rd ed. London: Sage.

Fischer, H.R. 2001. Abductive Reasoning as a way of world making. *Foundations of Science* 6(4), pp.361–383.

Fligstein, N. 1997. Social skill and institutional theory. *American Behavioral Scientist, 40*(4), 397–405.

Flynn, B.B., Sakakibara, S., Schroeder, R.G., Bates, K., and Flynn, E.J. 1990. Empirical research methods in operations management. *Journal of Operations Management* 9(2), pp.250-284.

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L.H., Holling, C.S., and Walker, B. 2002. Resilience and sustainable development: Building adaptive capacity in a world of transformations. *AMBIO A Journal of the Human Environment* 31(5), pp.437-440.

Forum for the Future. 2007. *Buying a better world: Sustainable Public Procurement.* [Online]. Available at: https://www.forumforthefuture.org/sites/default/files/project/downloads/buying-better-world.pdf [Accessed 15 August 2017].

Fraser Basin Council. 2009. *State of the Fraser Basin report.* Sustainability Snapshot 4: The Many Faces of Sustainability.

Freeman, R.E. 1984. *Strategic Management: A Stakeholder Approach.* Marshfield: MA. Pitman.

Fuentes-Bargues, J.L., González-Cruz, M.C., and González-Gaya, C. 2017. Environmental criteria in the Spanish public works procurement process. *International Journal of Environmental Research and Public Health* 14(2), pp.204-222.

Future Generations Commissioner for Wales. 2018. *Well-being in Wales: the journey so far.* [Online]. Available https://futuregenerations.wales/wp-content/uploads/2018/05/2018-05-10-FGCW-1-year-Report-_English.pdf [01 June 2018]

Garud, R., Hardy, C., and Maguire, S. 2007. Institutional entrepreneurship as embedded agency: An introduction to the special issue. *Organization Studies 28*(7), pp.957–969.

Garud, R., Jain, S., and Kumaraswamy, A. 2002. Institutional entrepreneurship in the sponsorship of common technological standards: The case of Sun Microsystems and Java. *Academy of Management Journal 45*(1), pp.196–214.

Gelderman, C.J., Semeijn, J., and Bouma, F. 2015. Implementing sustainability in public procurement: The limited role of procurement managers and party- political executives. *Journal of Public Procurement* 15(1), pp.66-92.

Gelderman, C.J., Semeijn, J., and Vluggen, R. 2017. Development of sustainability in public sector procurement. *Public Money and Management* 37(6), pp.435-442.

Geng, Y., and Doberstein, B. 2008. Greening government procurement in developing countries: building capacity in China. *Journal of Environmental Management* 88(4), pp.932-938.

Giddings, B., Hopwood, B., and O'Brien, G. 2002. Environment, economy and society: Fitting them together into sustainability development. *Sustainable Development* 10, pp.187–196.

Gioia, D.A., and Pitre, E. 1990. Multiparadigm perspective on theory building. *Academy of Management Review* 15(4), pp.584-602.

Gladwin, T.N., Kennelly, J.J., and Krause, T. 1995. Shifting paradigms for sustainable development: Implications for management theory and research. *The Academy of Management Review* 20(4), pp.874-907.

Glas, A.H., Schaupp., M., and Essig, M. 2017. An organizational perspective on the implementation of strategic goals in public procurement. *Journal of Public Procurement* 17(4), pp.572-605.

Global Footprint Network. 2015. [Online]. Available at: http://www.footprintnetwork.org/en/index.php/GFN/page/carbon_footprint/ [Accessed 01 August 2015].

Goldsmith, E., Allen, R., Allaby, M. and Davoll, J., and Lawrence, S. 1972. A blueprint for survival. *The Ecologist* 2(1), pp.1-22.

Gough, Harrison G. *Studying creativity by means of word association tests.* Journal of Applied Psychology, Vol 61(3), Jun 1976, 348-353

Government of Wales. 1998. *Chapter 38.* [Online]. Available at: https://www.legislation.gov.uk/ukpga/1998/38/pdfs/ukpga_19980038_en.pdf [Accessed 01 January 2017].

Grandia, J. 2015a. The role of change agents in sustainable public procurement projects. *Public Money and Management* 35(2), pp.119-126.

Grandia, J., Steijn, B., and Kuipers, B. 2015b. It is not easy being green: increasing sustainable public procurement behaviour. *Innovation: The European Journal of Social Science Research* 28(3), pp.243-260.

Grandia, J. 2016. Finding the missing link: Examining the mediating role of sustainable public procurement behaviour. *Journal of Cleaner Production* 124, pp.183-190.

Gray. D., Brown. S., Macanufo. J. 2010. *Game storming: A Playbook for Innovators, Rulebreakers and Changemakers*. California: O'Reilly Media.

Greenwood, R., and Hinings, C.R. 1996. Understanding radical organizational change: Bringing together the old and the new institutionalism. *Academy of Management Review 21*(4), pp.1022–1054.

Greenwood, R., Suddaby, R., and Hinings, C.R. 2002. Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal 45*(1), 58–80.

Grob, S., and Benn, S. 2014. Conceptualising the adoption of sustainable procurement: an institutional theory perspective. *Australasian Journal of Environmental Management* 21(1), pp.11-21.

Groundwork. 2015. *Welcome to green dragon.* [Online]. Available at: http://www.greendragonems.com/ [Accessed 20 July 2015].

Grzybowska, K. 2012. Sustainability in the supply chain: analysing the enablers. In: Golinska, P., and Romano, C A. *Environmental issues in supply chain management*. Berlin: Springer, pp.25-40

Guba, E. G. 1981. Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal 29*, pp.75–92.

Guba, E. G. 1990. *The Paradigm Dialog.* London: Sage.

Guba, E.G., and Lincoln, Y.S. 1989. *Fourth generation evaluation*. Newbury Park, CA: Sage.

Guba, E.G., and Lincoln, Y.S. 1994. Competing paradigms in qualitative research. In: Denzin, N.K., and Lincoln Y.S. eds. *Handbook of qualitative research*. Thousand Oaks, CA: Sage, pp.105-117.

Gudgin, G. 1984. Fuelling Britain: The future of coal. *Marxism Today* 28(6), 30–32.

Guenther, E., Hueske, A.K., Stechemesser, K., and Buscher, L. 2013. The 'why not' perspective of green purchasing: a multilevel case study analysis. *Journal of Change Management* 50(3), pp.407-423.

Gunder, M. 2006. Sustainability: planning's saving grace or road to perdition. *Journal of Planning, Education and Research* 26(2), pp.208-221.

Günther, E., and Scheibe, L. 2006. The hurdle analysis. A self-evaluation tool for municipalities to identify, analyse and overcome hurdles to green procurement. *Corporate Social Responsibility and Environmental Management* 13, pp.61–77.

Hall, P., Löfgren K., and Peters, G. 2016. Greening the street-level procurer: Challenges in the strongly decentralized Swedish system. *Journal of Consumer Policy* 39(4), pp.467–483.

Hall, M., and Purchase, D. 2006. Building or bodging? Attitudes to sustainability in UK public sector housing construction development. *Sustainable Development* 14, pp.205–218.

Halldorsson, A., Skjott-Larsen, T., and Kotzab, H. 2003. Interorganizational theories behind supply chain management – discussion and applications. In: Seuring, S., Muller, M., Goldbach, M. and Schneidewind, U. eds. *Strategy and organization in supply chains.* Physica-Verlag, Heidelberg, pp.31-63.

Hambrick, D.C. 2007. The field of management's devotion to theory: too much of a good thing? *Academy of Management Journal.* 50(6), pp.1346-1352.

Hansson, 0.S. 2010. Technology and the notion of sustainability. *Technology in Society* 32, pp.274–279.

Hardi, P. and Zdan, T. 1997. *Assessing sustainable development.* Winnipeg, Manitoba: International Institute for Sustainable Development.

Harland, C.M., Lamming, R.C., Walker, H., Phillips, W.E., Caldwell, N.D., Johnsen, T.E., Knight, L.A., and Zheng, J. 2006. Supply management: is it a discipline? *International Journal of Operations & Production Management* 26(7), pp.730-753.

Harvey, C., Kelly, A., Morris, H. and Rowlinson, M. 2015. *ABS Journal Quality Guide*. London: The Association of Business Schools.

Hawken, P. 1993*. The ecology of commerce: A declaration of sustainability.* New York, New York: Harper Business.

Heinberg, R. 2006. *Oil depletion protocol: A plan to avert oil wars, terrorism, and economic collapse.* BC, Canada: New Society Publishers.

Hempel, L.C. 1999. *Conceptual and analytical challenges in building sustainable communities.* In: Mazmanian, D.A., and Kraft, M.E. eds. *Toward sustainable communities: Transition and transformation in environmental policy*. Cambridge, MA: The MIT Press, pp.43–74.

Herold, D. M., Fedor, D. B., Caldwell., S. D. and Liu, Y. 2008. The Effects of Transformational and Change Leadership on Employees' Commitment to a Change: A Multilevel Study. *Journal of Applied Psychology* 93, pp346–357.

Ho, L.W., Dickinson, N.M., and Chan, G.Y. 2010. Green procurement in the Asian public sector and the Hong Kong private sector. *Natural Resources Forum* 34(1), pp.24–38.

Hochschorner, E., and Finnveden, G. 2006. Life cycle approach in the procurement process: The case of defence materiel. *International Journal of Life Cycle Assessment* 11(3), pp.200-208.

Hodgson, G. M. 2006. What are institutions? *Journal of Economic Issues* 40(1), pp.1-25.

Holdgate, M., and Synge, H. eds. 1993. The future of IUCN. Cambridge, UK: IUCN.

Holling, C. 2000. *Theories for sustainable futures.* [Online]. Available at: http://www.consecol.org/vol4/iss2/art7/ [Accessed 10 July 2018].

Holloway, I., and Todres, L. 2003. *The status of method: flexibility, consistency and coherence. Qualitative Research*. 3, pp.345-357.

Holm, P. (1995). The dynamics of institutionalization: Transformation processes in Norwegian fisheries. *Administrative Science Quarterly 40*(3), 398–422.

Holmberg, J. ed. 1994. *Policies for a small planet*. London: Earthscan.

Hopwood, B., Mellor, M. and O'Brien, G. 2005. Sustainable development: mapping different approaches. *Sustainable Development* 13(1), pp.38-52.

Hou, F.M. and Cai, T. 2016. Effects of forest products green public procurement on China: Based on cost-benefit analysis and survey. *Journal of Mechanical Engineering Research and Developments* 39(4), pp.1060-1066.

Hueskes, M., Verhoest, K., and Block, T. 2017. Governing public–private partnerships for sustainability: An analysis of procurement and governance practices of PPP infrastructure projects. *International Journal of Project Management* 35(6), pp.1184-1195.

Hueting, R., and Reijnders, L. 1998. Sustainability is an objective concept. *Ecological Economics* 27(2), pp.139-147.

Igarashi, M., de Boer, L., Pfuhl, G. 2017. Analyzing buyer behavior when selecting green criteria in public procurement. *Journal of Public Procurement* 17(2), pp.141-186.

Igarashi, M., de Boer, L., and Michelsen, O. 2015. Investigating the anatomy of supplier selection in green public procurement. *Journal of Cleaner Production* 108, pp.442-450.

Institute for Competition & Procurement Studies. 2016. Welsh national procurement awards. [Online]. Available at: http://www.welshprocurementawards.org.uk/2016winshort.pdf [Accessed 15 December 2016].

Institute of Environmental Management. 2015. *BS 8555*. [Online]. Available at: http://ems.iema.net/acorn_scheme/bs8555 [Accessed 01 September 2015].

International Energy Agency, World Energy Outlook. 2012. *IPCC Fifth Assessment Report.* Lima Climate action high level session; analysis by the generation foundation. Based on Generation Foundation, Allocation Capital for Long-term returns, 2015.

International Union for Conservation of Nature (IUCN) United Nations Environment Programme (UNEP) and the World Wildlife Fund (WWF). 1980. World Conservation Strategy—Living Resource Conservation for Sustainable Development. [Online]. Available at: https://portals.iucn.org/library/efiles/documents/wcs-004.pdf [Accessed 15 April 2015].

IPCC. 2007a. Climate Change 2007: Synthesis Report. [Online]. Available at: https://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf [Accessed 09 July 2015].

IPCC. 2007b. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 976pp.

Iraldo, F., Nucci, B., and De Giacomo, M.R. 2016. The relevance of life cycle costing in green public procurement. *Economics and Policy of Energy and the Environment* 1, pp.91-109.

ISO 2015a. *ISO standards in action.* [Online]. Available at: http://www.iso.org/iso/home/standards/management-standards/iso14000.html [Accessed 20 July 2015]

ISO 2015b. *ISO - Quality Management.* [Online]. Available at: http://www.iso.org/iso/home/standards/management-standards/iso_9000.htm [Accessed 21 July 2015].

IUCN, UNEP and WWF. 1991. Caring for the earth: A strategy for sustainable living. Switzerland: Gland.

Jenkins, G. J., Murphy, J. M., Sexton, D. M. H., Lowe, J. A., Jones, P. and Kilsby, C. G. 2009. UK Climate Projections: Briefing report. Met Office Hadley Centre, Exeter, UK.

Jennings, D. D., and Zandbergen, P.A. 1995. Ecologically sustainable organizations: An institutional approach. *The Academy of Management Review* 20(4), pp.1015-1052.

Jensen, M.C., and Meckling, W.H. 1976. Theory of firm-managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics* 3(4), pp.305-360.

Johnston, A. 2014. Rigour in research: theory in the research approach. *European Business Review* 26(3), pp.206-217.

Johnson, R. B., and Christensen, L. B. 2004. *Educational research: Quantitative, qualitative, and mixed approaches.* Boston, MA: Allyn and Bacon.

Johnson, R.B., and Onwuegbuzie, A.J. 2004. Mixed Methods Research: A Research Paradigm whose Time Has Come. *Educational Researcher* 33(7), pp.14-26.

Jones, J.G. 2014. *The history of Wales*. Cardiff: University of Wales Press.

Kanapinskas, V., Plytnikas, Ž., and Tvaronavičienė, A. 2014. Sustainable public procurement: Realization of the social aspect in Republic of Lithuania. *Business: Theory and Practice* 15(4), pp.302-315

Kate, R.W., Parris, T.M., and Leiserowitz, A.A. 2005. *What is sustainable development? Goals, indicators, values and practice. Environment: Science and Policy for Sustainable Development* 47(3), pp.8–21.

Keulemans, S., and Walle, S.V.D. 2017. Cost-effectiveness, domestic favouritism and sustainability in public procurement: A comparative study of public preferences. *International Journal of Public Sector Management* 30(4), pp.328-341.

Khan, S. 2006. *GLA Economics publications.* [Online]. Available at: https://www.london.gov.uk/what-we-do/research-and-analysis/gla-economics-publications [Accessed 01 January 2017].

Ki-Moon, B. 2012. Remarks to the General Assembly on his Five-Year Action Agenda: "The Future We Want. [Online]. Available at: https://www.un.org/sg/en/content/sg/speeches/2012-01-25/remarks-general-assembly-his-five-year-action-agenda-future-we-want [Accessed February 2018].

Ki-Moon, B. 2014. *Secretary-General's Press Encounter at the People's Climate March*. [Online]. Available at: https://www.un.org/sg/en/content/sg/press-encounter/2014-09-21/secretary-generals-press-encounter-people%E2%80%99s-climate-march [Accessed 03 August 2015].

Kindy, A.M.Z., Shah, I.M., and Jusoh, A. 2016. Consideration and methodological approaches in studying transformational leadership impact on work performance behaviors. *International Journal of Advanced Research* 4(1), pp.889- 907.

King, G. 2007. *Modern Welsh dictionary: A guide to the living language (Welsh).* Oxford: Oxford University Press.

Kingsley, J. D. 1944. *Representative bureaucracy: An interpretation of the British civil service.* Yellow Springs, OH: Antioch Press.

Kleine, D., and Brightwell, M.D.G. 2015. Repoliticising and scaling-up ethical consumption: Lessons from public procurement for school meals in Brazil. *Geoforum* 67, pp.135–147.

Knight, L., Tate, W., Matopoulos, A., Meehan, J. and Salmi, A. 2016. Breaking the mold: Research process innovations in purchasing and. supply management. *Journal of purchasing and supply management* 22(4), pp.239-366.

Kolk, A. 2016. The social responsibility of international business: From ethics and the environment to CSR and sustainable development. *Journal of World Business* 51, pp.23–34.

Koloski, B. 2012. *Don't Have a Meeting, Throw a Workshop.* [Online] Available at: http://uxmag.com/articles/don%25E2%2580%2599t-have-a-meeting-throw-aworkshop [Accessed 15 June 2017]

Koplin, J. 2005. Integrating environmental and social standards into supply management: An action research project. In: Kotzab, H, Seuring, S., Müller, M. and Reiner, G. eds. *Research methodologies in supply chain management*. Heidelberg: Physica-Verlag.

Kordestani, A., Sattari, S., Peighambari, K., and Oghazi, P. 2017. Exclude me not: The untold story of immigrant entrepreneurs in Sweden. *Sustainability* 9(9), pp.1-22.

Krislov, S. 1974. *Representative bureaucracy.* Englewood Cliffs, NJ: Prentice Hall.

Kuhn, T.S. 1962. *The Structure of Scientific Revolutions.* (1st ed). Chicago: University of Chicago Press.

Kuhn, T.S. 1996. *The Structure of Scientific Revolutions.* (3rd ed). Chicago: University of Chicago Press.

Kunzlik, P. 2003. Making the market work for the environment: acceptance of (some) 'green' contract award criteria in public procurement. *Journal of Environmental Law* 15, pp.175–201.

Kythreotis**,** A. 2015. *Can the Well-Being of Future Generation Act set a new climate agenda for well-adapted communities in Wales?* [Online]. Available at: http://blogs.cardiff.ac.uk/sustainableplaces/2015/06/02/can-the-well-being-of-future-generation-act-set-a-new-climate-agenda-for-well-adapted-communities-in-wales/ [Accessed 28 October 2015].

Lafferty, W., and Meadowcroft, J. 2000. *Implementing sustainable development: strategies and initiatives in high consumption societies.* Oxford: Oxford University Press Scholarship.

Lafferty, W.M., and Langhelle, O. 1999. eds. *Towards sustainable development: on the goals of development – and the conditions of sustainability*. London: Macmillan.

Lamming, R., and Hampson, J. 1996. *The environment as a supply chain management issue*. British Journal of Management 7(s1), ppS45-S62

Lather, P. 1993. Fertile obsession: Validity after poststructuralism. *The Sociological Quarterly* 34, pp.673-693.

Lawn, P. 2016. *Resolving the climate change crisis.* Adelaide, Australia: Springer Nature.

Lawrence, T. B. 2008. *Power, institutions and organizations.* In: R. Greenwood, C.O, Sahlin, K and Suddaby, R. (Eds.). Sage handbook of organizational institutionalism. London: Sage. pp. 170–197.

Lee, K. 2000. Global sustainable development: its intellectual and historical roots. In: Lee, K., Holland, A. and McNeill, D. eds. *Global sustainable development in the 21st century.* Edinburgh: Edinburgh University Press, pp.31–47.

Leiser, M.S., and Wolter, S.C. 2017. Empirical evidence on the effectiveness of social public Procurement Policy: The Case of the Swiss Apprenticeship Training System. *Labour* 31(2), pp.204-222.

Lele, S.M. 1991. Sustainable development: A critical review. *World Development* 19(6), pp.607-621.

Leiren, M.D., and Jacobsen, J.K.S. (2018). Silos as barriers to public sector climate adaptation and preparedness: insights from road closures in Norway. *Local Government studies* 44(4), pp.492–511.

Lewis, S.J., and Russell, A.J. 2011. Being embedded: A way forward for ethnographic research. *Ethnography* 12, pp.398–416.

Lev, B. 2001. *Intangibles: Management, Measurement, and Reporting.* Brookings Institution Press: Washington.

Li, L., and Geiser, K. 2005. Environmentally responsible public procurement (ERPP) and its implications for integrated product policy (IPP). *Journal of Cleaner Production* 13, pp.705-715.

Lincoln, Y.S., and Guba, E.G. 1985. *Naturalistic Inquiry.* Newbury Park, CA: Sage.

Loader, K. 2013. Is public procurement a successful small business support policy? A review of the evidence. *Environment and Planning C: Government and Policy* 31(1), pp.39-55.

Long, N. 1952. Bureaucracy and constitutionalism. *American Political Science Review* 46, pp.808-818.

Long, T., and Johnson, M. 2000. Rigour, reliability, and validity in qualitative research. *Clinical Effectiveness in Nursing* 4(1), pp.30-37.

Lynch, J. 2015. Configuring the strategic orientation of manufacturing firms for economic sustainability. PhD Thesis, Cardiff University.

Maguire, S., Hardy, C., and Lawrence, T. 2004. Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada. Academy of Management Journal 47 (5), pp.657–679.

Maguire, S., Hardy, C., and Lawrence, T.B. 2004. Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada. *Academy of Management Journal 47*(5), pp.657–679.

Marinez-Moyano, I. J. 2006. *Exploring the Dynamics of Collaboration in Interorganizational Settings*." In: Schuman (Editor). *Creating a Culture of Collaboration*. Jossey-bass. Ch. 4, pp.69-86.

Marshall, M. 2014. Researchers-in-residence: a solution to the challenge of evidence-informed improvement? Primary Health Care Research and Development 5, pp.337–338.

Marshall, M., Pagel, C., French, C., Utley, M., Allwood, D., Fulop, N., Pope, C., Banks, V., and Goldmann, A. 2014. Moving improvement research closer to practice: the researcher-in-residence model. BMJ Quality Safety 23, pp.801–805.

Maxwell, J.A. 1992. Understanding and validity in qualitative research. *Harvard Educational Review* 62, pp.279-300.

Maxwell, J.A. 1996. *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage.

McCrudden, C. 2004. Using public procurement to achieve social outcomes. *Natural Resources Forum* 28, pp.257–267.

McCrum, K. 2014. *The communities torn apart by coal mining.* [Online]. Available at: http://www.walesonline.co.uk/whats-on/arts-culture-news/communities-torn-apart-coal-mining-7800089 [Accessed 25 August 2017].

McGinity, R., and Salokangas, M. 2014. Introduction: "Embedded Research" as an approach into academia for emerging researchers. *Management in Education* 28, pp.3–5.

McMurray, A.J., Islam, M.M., Siwar, C., and Fien, J. 2014. Sustainable procurement in Malaysian organizations: practices, barriers and opportunities. *Journal of Purchasing and Supply Management* 20(3), pp.195-207.

McNiff, J. 2014. *Writing and doing action research.* London: Sage.

Meadows, D.H., Meadows, D.L., Randers, J., and William, W. B, III. 1972. *The limits to growth: A report for the club of Rome's project on the predicament of mankind.* New York, New York: Universe Books.

Meadows, D. H., Meadows, D. L., and Randers, J. 1992. *Beyond the limits: Confronting global collapse-envisioning a sustainable future.* Post Mills, VT: Chelsea Green.

Mebratu, D. 1998. Sustainability and Sustainable Development: Historical and Conceptual Review. *Environmental Impact Assessment Review* 18, pp.493-520.

Meehan, J., and Bryde, D. 2011. Sustainable procurement practice. *Business Strategy and the Environment* 20, pp.94–106.

Meehan, J., Ludbrook, M.N., and Mason, C.J. 2015. Collaborative public procurement; an institutional explanation of legitimised resistance. [Online]. Available at: https://livrepository.liverpool.ac.uk/2009459/1/Ipsera%202015%20full%20paper%20SUBMIT.pdf [Accessed 15 January 2018]

Meehan, J., Menzies, L., Michaelides, R. 2017. The long shadow of public policy; Barriers to a value-based approach in healthcare procurement. *Journal of Purchasing and Supply Management* 23(4), pp.229-241.

Melnyk, S.A., and Handfield, R.B. 1998. May you live in interesting times: the emergence of theory-driven empirical research. *Journal of Operations Management* 16(4), pp.311-319.

Merriam, S.B. 1998. *Qualitative research and case study applications in education.* San Francisco: Jossey-Bass.

Meyer, J. W. and Rowan, B. 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology* 83(2), pp.340–363.

Michael, R. 1998. Sustainable development: Needs, values, rights. *Environmental Values* 2(1), pp.3-20.

Michaelis, B., Stegmaier, R., and Sonntag, K. 2010. Shedding Light on Followers' Innovation Implementation Behavior: The Role of Transformational Leadership, Commitment to Change, and Climate for Initiative. *Journal of Managerial Psychology* 25: pp.408–429.
Michelsen, O., and de Boer, L. 2009. Green procurement in Norway; a survey of practices at the municipal and county level. *Journal of Environmental Management* 91(1), pp.160-167.

Michelsen, O., Fet, A.M., Dahlsrud, A. 2006. Eco-efficiency in extended supply chains: a case study of furniture production. *Journal of Environmental Management* 79, pp.290–297.

Middleton, N., O'Keef, P., and Moyo, S. 1993. *Tears of the crocodile: From Rio to reality in the developing world.* London: Pluto Press.

Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: Synthesis.* Washington, DC: Island Press.

Millett**,** D. 2015. *In Brief: Greenhouse Gas Emissions in Wales up by 10%.* [Online]. Available at: https://assemblyinbrief.wordpress.com/2015/06/16/greenhouse-gas-emissions-in wales-up-by-10/ [Accessed 01 December 2015].

Min, H., and Galle, W. 2001. Green purchasing practices of US firms. *International Journal of Operations & Production Management* 21, pp.1222–1238.

Miner, J. B. 1984. The validity and usefulness of theories in an emerging organizational science. *Academy of Management Review* 9, pp.296 –306.

Miner, J. B. 2003. The rated importance, scientific validity, and practical usefulness of organizational behavior theories: A quantitative review. *Academy of Management Learning and Education* 2, pp.250 –268.

Mohammed, I.A.H. 2017. Some issues in the institutional theory: A critical analysis. *International Journal of Scientific Technology Research* 6(9), pp.150-156.

Mohr, J. 1982. *Explaining organizational behavior*. San Francisco, CA: Jossey-Bass.

Molenaar, K.R., Sobin, N., and Antillon, E.I. 2010. A synthesis of best-value procurement practices for sustainable design-build projects in the public sector. *Journal of Green Building* 5(4), pp.148-157.

Mora, C., Wei, C.L., Rollo, A., Amaro, T., Baco, A.R., Billett, D., Bopp, L., Chen, Q., Collier, M., Danovaro,R., Gooday, A., Grupe, B.M., Halloran, P.R., Ingels, J., Jones, D.O.B., Lewis, L.A., Nakano, H., Norling, K., Ramirez-Llodra, E., Rex, M., Ruhl, H.A., Smith, C.R., Sweetman, A.K., Thurber, A.R., Tjiputra,J.F. Usseglio, P., Watling, L., Wu, T., and Yasuhara, M. 2013. Biotic and human vulnerability to projected changes in ocean biogeochemistry over the 21st century. *PLOS Biology* 11(10), 1-14.

Morse, M.J. 2015. Critical analysis of strategies for determining rigor in qualitative inquiry. *Qualitative Health Research* 25(9), pp.1212–1222.

Munday, M., and Roberts, A. 2016. Developing approaches to measuring and monitoring sustainable development in Wales: A Review. *Regional Studies* 40(5), pp.535-554.

Murphy, J., and Cohen, M. 2001. *Consumption, environment and public policy.* In: Cohen, M., and Murphy, J. eds. *Exploring sustainable consumption; Environmental policy and the social sciences* Oxford, UK: Elsevier, pp.3-17.

Murray, J.G. 2000. Effects of a green purchasing strategy: the case of Belfast City Council. *Supply Chain Management: An International Journal* 5(1), pp.37-44.

Nash, H.A. 2009. The European Commission's sustainable consumption and production and sustainable industrial policy action plan. *Journal of Cleaner Production* 17(4), pp.496–498.

National Assembly of Wales. 2011a. *Key Issues for the Fourth Assembly.* National Assembly of Welsh: Research Services.

National Assembly of Wales. 2011b. *Regional and Local Gross Value Added - December 2011.* [Online]. Available at: http://www.assembly.wales/Research%20Documents/Regional%20and%20Local%20Gross%20Value%20Add d%20-%20Research%20paper-16122011-228955/11-073-English.pdf [Accessed 01 December 2016].

National Assembly of Wales. 2013. *Greenhouse Gas Emissions in Wales February 2013.* [Online]. Available at: http://www.assembly.wales/Research%20Documents/Greenhouse%20Gas%20Emissions%20in%20Wales%20 %20Research%20paper-06022013-242880/13-006-English.pdf [Accessed 01 December 2016].

National Coal Museum. 2009. Pickets, police and politics. [Online]. Available at: https://www. peoplescollection.wales/sites/pcw/files/documents/strike-en.pdf [Accessed February 2017].

National Welsh Assembly. 2017. *The History of Welsh Devolution*. [Online]. Available at: http://www.assembly.wales/en/abthome/role-of-assembly-how-it-works/Pages/history-welsh-devolution.aspx [Accessed 24 February 2018].

Network of Regional Governments for Sustainable Development. 2017. *Nrg4sd homepage.* [Online]. Available at: http://www.nrg4sd.org/ [Accessed 01 June 2017].

New Economic Foundation. 2005. Public spending for public benefit. [Online]. Available at: https://neweconomics.org/uploads/files/bafccecadede5da071_okm6b68y1.pdf [Accessed 12 June 2015].

Nijaki, L.K., and Worrel, G. 2012. Procurement for sustainable local economic development. *International Journal of Public Sector Management* 25(2), pp.133-153.

Nikolaou, I.E., and Loizou, C. 2015. The Green Public Procurement in the midst of the economic crisis: is it a suitable policy tool? *Journal of Integrative Environmental Sciences* 12(1), pp.49-66.

Nissinen, A., Parikka-Alhola, K., and Rita, H. 2009. Environmental criteria in the public purchases above the EU threshold values by three Nordic countries: 2003 and 2005. *Ecological Economics* 68(6), pp.1838-1849.

NOAA. 2017. Global Climate Dashboard. [Online]. Available at: https://www.climate.gov/#slideshow-0 [Accessed 10 January 2018].

North, D.C. 1990. *Institutions, institutional change, and economic performance*. Cambridge, UK: Cambridge University Press.

NAO. 2010. What are third sector organisations and their benefits for commissioners? [Online]. Available at: https://www.nao.org.uk/successful-commissioning/introduction/what-are-civil-society-organisations-and-their-benefits-for-commissioners/ [Accessed 12 March 2017]

Noble, H., and Smith, J. 2015. Issues of validity and reliability in qualitative research. *Evidence Based Nursing* 18(2), pp.34-35.

Nordhaus, W.D. 2007. A review of the stern review on the economics of climate change. *Journal of Economic Literature* XLV (September 2007), pp.686–702.

OECD. 2000. *Greener public procurement: Issues and practical solutions.* Paris: Organisation for Economic Co-operation and Development.

OECD. 2002. *Organization for economic co-operation and development. Recommendation of the council on improving the environmental performance of public procurement*.

Offei, I., Kissi, E., and Badu, E. 2016. Public procurement policies and strategies for capacity building of SME construction firms in Ghana. *International Journal of Procurement Management* 9(4), pp.455-472.

Office for National Statistics. 2001. *200 years of census in…Wales.* London: ONS London Library.

Office for National Statistics. 2013. *Profile of Wales*. [Online]. Available at: http://www.ons.gov.uk [Accessed 05 January 2017].

Oliver, C. 1992. The antecedents of de-institutionalization. *Organization Studies* 13, pp563–588.

Organisation for Economic Co-operation and Development. 2006. OECD Fact book. Paris: Organisation for Economic Cooperation and Development.

Oruezabala, G., and Rico, J. 2012. The impact of sustainable public procurement on supplier management - The case of French public hospitals. *Industrial Marketing Management* 41(4), pp.573-580.

Osborne, H. 2006. *Stern report: the key points.* [Online]. Available at: https://www.theguardian.com/politics/2006/oct/30/economy.uk [Accessed 21 May December 2016].

Owen, R.E., Witt, S.F., and Gammon, S. 1993. Sustainable tourism development in Wales: From theory to practice. *Tourism Management* 14(6), pp.463-474.

Pacheco-Blanco, B., and Bastante-Ceca, M.J. 2016. Green public procurement as an initiative for sustainable consumption. An exploratory study of Spanish public universities. *Journal of Cleaner Production* 133(1), pp.648-656.

Palm, J., and Backman, F. 2017. Public procurement of electric vehicles as a way to support a market: Examples from Sweden. *International Journal of Electric and Hybrid Vehicles* 9(3), pp.253-268.

Palmer, J., Cooper, I., and Vorst, R.D.V. 1997. Mapping out fuzzy buzzwords - Who sits where on sustainability and sustainable development. *Sustainable Development* 5(2), pp.87-93.

Palmujoki, A., Parikka-Alhola, K., and Ekroos, A. 2010. Green public procurement: Analysis on the use of environmental criteria in contracts. *Review of European Community and International Environmental Law* 19(2), pp.250-262.

Palthe, J. 2014. Regulative, normative and cognitive elements of organisations: Implication for managing change. *Management and Organizational Studies* 1(2), pp.59-66.

Pandey, S.C., and Patnaik, S. 2014. Establishing reliability and validity in qualitative inquiry: a critical examination. *Journal of Development and Management Studies* 12(1), pp.5743-5753.
Parikka-Alhola, K. 2008. Promoting environmentally sound furniture by green public procurement. *Ecological Economics* 68(1-2), pp.472- 485.

Parikka-Alhola, K., and Nissinen, A. 2012. Environmental impacts of transport as award criteria in public road construction procurement. *International Journal of Construction Management* 12(2), pp.35-49.

Parr, A. 2012. *Hijacking Sustainability*. Cambridge: MIT Press.

Pavelin, K., Pundir, S., and Cham., J.A. 2014. Ten Simple Rules for Running Interactive Workshops. *PLOS Computational Biology* 10(2), pp.1-5.

Pearce, D. 1993. *Blueprint 3. Measuring sustainable development.* London: Earthscan Publications, Ltd.

Pearce, D. W., Markandya, A., and Barbier, E. B. 1989. *Blueprint for a green economy.* London: Earthscan Publications, Ltd.

Peattie, K. 2005a. *Wales - Sustainable Development and Leadership: An Essay.* Cambridge Programme for Industry/Cynnal Cymru: Cambridge.

Peattie, K. ed. 2005b. *Wales and Sustainable Development: A Reference Compendium.* Cynnal Cymru/Cambridge Programme for Industry.

Perry, J. L., and Wise, L. R. 1990. The Motivational Bases of Public Service. *Public Administration* Review 50, pp.367–373.

Perry, J. L., and Hondeghem, A. 2008. Building theory and empirical evidence about public service motivation. *International Public Management Journal* 11(1), pp.3–12.

Phillips, J. 2016. *The Miners' Strike in Britain, 1984-85*. [Online]. Available at: https://www.foe.co.uk/sites/ default/files/downloads/campaigning-change-lessons-from-history-miners-strike-101820.pdf [Accessed 15 June 2017].

Phillips, N., Lawrence, T.B., and Hardy, C. 2000. Inter-organizational collaboration and the dynamics of institutional fields. *Journal of Management Studies 37*(1), pp.23–44.

Pirvu, D., and Clipici, E. 2016. Social enterprises and the EU's public procurement market. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations* 27(4), pp.1611-1637.

Porritt, J. 2009. *The standing of sustainable development in government.* Cheltenham: Forum for the Future.

Porter, M.E., and van de Linde, C. 1995. Green and competitive. *Harvard Business Review* 73(5), pp.120-34.

Preuss, L. 2007. Buying into our future: sustainability initiatives in local government procurement. *Business Strategy and the Environment* 16(5), 354–365.

Preuss, L. 2009. Addressing sustainable development through public procurement: The case of local government. *Supply Chain Management: An International Journal* 14(3), pp.213-223.

Preuss, L., and Walker, H. 2011. Psychological barriers in the road to sustainable development: evidence from public sector procurement. *Public Administration: An international quarterly* 89(2), pp.493–521.

Prier, E., Schwerin, E., and McCue, C.P. 2016. Implementation of sustainable public procurement practices and policies: A sorting framework. *Journal of Public Procurement* 16(3), pp.312-346.

Public Services (Social Value) Act 2012. *Chapter 3.* [Online]. Available at: http://www.legislation.gov.uk/ukpga/2012/3/enacted [Accessed 01 September 2017].

Rahman, M.S., and Islam, M.Z. 2017. Scope and approaches of integrating sustainability issues in public procurement process for sustainable development of Bangladesh. *International Journal of Procurement Management* 10(2), pp.163-177.

Rainville, A. 2017. Standards in green public procurement – A framework to enhance innovation. *Journal of Cleaner Production* 167, pp.1067-1037.

Reason, P., and Bradbury, H. eds. 2008. *The Sage Handbook of Action Research* 2nd ed. London: Sage.

Redclift, M. 1987. *Sustainable development: Exploring the contradictions*. London: Methuen.

Rehmatulla, N., Smith, T., and Tibbles, L. 2017. The relationship between EU's public procurement policies and energy efficiency of ferries in the EU. *Marine Policy* 75, pp.278-289.

Reiter-Theil, S. 2004. Does empirical research make bioethics more relevant? "The embedded researcher" as a methodological approach. *Medicine, Health Care and Philosophy* 7, pp.17–29.

Research Advisory Panel. 2006. *Economic Future for Wales.* Welsh Government.

Rimmington, M., Smith, J.C., and Hawkins, R. 2006. Corporate social responsibility and sustainable food procurement. *British Food Journal* 108(10), pp.824-837.

Ritchie, J., and Lewis, J. 2003. *Qualitative research practice: a guide for social science students and researchers*. London: Sage.

Rittel, H., and Webber, M. 1973. Dilemmas in a general theory of planning. *Policy Sciences* 4(2), pp.155-169.

Rizzi, F, Frey, M., and Testa, F., and Appolloni, A. 2014. Environmental value chain in green SME networks: The threat of the Abilene paradox. *Journal of Cleaner Production* 85, pp.265-275.

Rolfe, G. 2006. Validity, trustworthiness and rigour: quality and the idea of qualitative research. *Journal of Advance Nursing* 53, pp.304–310.

Rolfstam, M. 2009. Public procurement as an innovation policy tool: The role of institutions. *Science Public Policy* 36(5), pp.349-360.

Roman, A.V. 2017. Institutionalizing sustainability: a structural equation model of sustainable procurement in US public agencies. Tracing the effects of politicization on public procurement specialists' decision-making through values: A structural equation model of the broker-purist lens. *Journal of Public Procurement* 17(1), pp.52-87.

Rost, J. 1991. *Leadership for the twenty-first century.* Westport, CT: Praeger

Rousseau, D.M., Manning, J., and Denyer, D. 2008. Evidence in management and organizational science: assembling the fields full weight of scientific knowledge through syntheses. *Academy of Management Annals* 2(1), pp.475-515.

Roy, E., and Jennings, M. 2011. *Is the Welsh economy over-reliant on the public sector?* [Online]. Available at: http://www.cynulliad.cymru/NAfW%20Documents/ki-014.pdf%20-%2003112011/ki-014-English.pdf [Accessed 01 Dec 2016].

Rushmer, R.K., Hunter, D.J., and Steven, A. 2014. Using interactive workshops to prompt knowledge exchange: a realist evaluation of a knowledge to action initiative. *Public Health* 128, pp. 522-560

Sachs, W. 1995. Global ecology and the shadow of "development." In: Sessions, G. ed. *Deep ecology for the 21st century*. Boston: Shambhala, pp.428-444.

Saldana, J. 2016. *The coding manual for qualitative researchers*. 3rd ed. London: Sage.

Saunders, M., Lewis, P., and Thornhill, A. 2007. *Research methods for business students*. 3rd Ed. Essex, England: Pearson Education Limited.

Saunders, M., Lewis, P., and Thornhill, A. 2009 *Research Methods for Business Students.* 5th Ed. Essex, England: Pearson Education Limited.

Saunders, M., Lewis, P., and Thornhill, A. 2012. *Research methods for business students*. 6th Ed. Essex, England: Pearson Education Limited.

Savitz, A.W., and Weber, K. 2006. *The Triple Bottom Line.* San Francisco, CA: Jossey-Bass.

Schmenner, R.W., Wassenhove, L.V., Ketokivi, M., Heyl, J., and Lusch, R.F. 2009. Too much theory, not enough understanding. *Journal of Operations Management* 27(5), pp.339-343.

Schwandt, T.A. 1997. *Qualitative inquiry: A dictionary of terms.* Thousand Oaks, CA: Sage.

Scott, W. R. 2001. *Institutions and organizations*. 2nd ed. Thousand Oaks, CA: Sage.

Scott, W.R. 1995. *Institutions and Organizations. Ideas, Interests and Identities*. 3rd Ed. Thousand Oaks, CA: Sage.

Scott, W.R. 2014. *Institutions and Organizations. Ideas, Interests and Identities*. 4th Ed. Thousand Oaks, CA: Sage.

Selznick, P. 1949. *TVA and the grass roots.* Berkeley, CA: University of California Press.

Selznick, P. 1957. *Leadership in administration.* Evanston, IL: Row, Peterson.

Seuring, S., and Müller, M. 2008. From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production* 16(15), pp.1699-1710.

Shrivastava, P. 1995. The role of corporations in achieving ecological sustainability*. The Academy of Management Review* 20(4), pp.*936*-960.

Sibbet, D. 2010. *Visual Meetings: How graphics, sticky notes and idea mapping can transform group productivity*. New Jersey: John Wiley & Sons.

Sitzmann, T., Ely, D.K., Brown, K.G. and Bauer, K.N. 2010. Self-Assessment of Knowledge: A Cognitive Learning or Affective Measure? *Academy of Management Learning & Education* 9(2), pp. 169 –191.

Smith, J., Andersson, G., Gourlay, R., Karner, S., Mikkelsen, B.E., Sonnino, R., and Barling, D. 2016. Balancing competing policy demands: The case of sustainable public sector food procurement. *Journal of Cleaner Production* 112(1), pp.249-256.

Smith, C.R., and Fernandez, S. 2010. Equity in federal contracting: examining the link between minority representation and federal procurement decisions. *Public Administration Review* 70(1), pp.87-96.

Sneddon, C., Howarth, R.B., and Norgaard, R.B. 2006. Sustainable development in a post-Brundtland world. *Ecological Economics* 57, pp.253-268.

Sonnino, R. 2009. Quality food, public procurement, and sustainable development: The school meal revolution in Rome. *Environment and Planning A* 41, pp.425-440.

Sourani A., and Sohail M. 2013. Enabling sustainable construction in UK public procurement. Proceedings of Institution of Civil Engineers. *Management, Procurement and Law* 166(MP6), pp.297-312.

Spencer-Oatey, H. 2008. *Culturally Speaking. Culture, Communication and Politeness Theory.* 2nd edition. London: Continuum

Sporrong, J., and Bröchner, J. 2009. Public procurement incentives for sustainable design services: Swedish experiences. *Architectural Engineering and Design Management* 5(1-2), pp.24-35.

Starik, M., and Rands, G. 1995. Weaving an integrated web: Multilevel and multisystem perspectives of ecologically sustainable organizations. *The Academy of Management Review* 20(4), pp.908-935.

StatsWales. 2016. *Population density (persons per square kilometre) by local authority and year*. [Online].Available at: https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Density/populationdensity-by localauthority-year [Accessed 01 January 2017].

Stefani, G., Tiberti, M., Lombardi, G.V., Cei, L., and Sacchi, G. 2017. Public food procurement: A systematic literature review. *International Journal on Food System Dynamics* 8(4), pp.270-283.

Stern, N. H. 2007. *The economics of climate change: The Stern review*. Cambridge, UK, Cambridge University Press.

Steurer R., Martinuzzi A., and Margula S. 2012. Public Policies on CSR in Europe: Themes, Instruments, and Regional Differences. *Corporate Social Responsibility and Environmental Management* 19(4), pp.206-227.

Štofová, L., and Szaryszová, P. 2016. Environmental criteria of public procurement as a tool of development sustainability. *Quality - Access to Success* 17(152), p67-70.

Suchman, M.C. 2003. The contract as social artefacts. *Law and Society Review* 37(1), pp.91.142

Suchman, M. C. 1995. Localism and globalism in institutional analysis: The emergence of contractual norms in venture finance. In: Scott, W.R. and Christensen, S. eds. *The institutional construction of organizations: international and longitudinal studies*. Thousand Oaks, CA: Sage, pp.39-63.

Sustainable Development Commission. 2004. *Welsh Assembly Government's Sustainable Development Action Plan 2004 – 2007.* [Online]. Available at: http://www.sd-commission.org.uk/presslist.php/10/welsh-assembly-governments-sustainable-development-action-plan-2004-2007 [Accessed 20 January 2017].

Sutter, J.D and Berlinger, J. 2015. *Final draft of climate deal formally accepted in Paris.* [Online]. Available at*:* https://edition.cnn.com/2015/12/12/world/global-climate-change-conference-vote/index.html *[Accessed 14 December 2015].*

Swanson, M., Weissman, A., Davis, G., Socolof, M.L., and Davis, K. 2005. Developing priorities for greener state government purchasing: a California case study. *Journal of Cleaner Production* 13(7), pp.669-677.

Tarantini, M., Loprieno, A.D., and Porta, P.L. 2011. A life cycle approach to green public procurement of building materials and elements: A case study on windows. *Energy* 36, pp.2473-2482.

Tashakkori, A., Teddlie, C. eds. 2003. *Handbook of mixed methods in social and behavioral research.* Thousand Oaks, CA: Sage.

Testa, F., Annunziata, E., Iraldo, F., and Frey, M. 2016a. Drawbacks and opportunities of green public procurement: An effective tool for sustainable production. *Journal of Cleaner Production* 112(3), pp.1893-1900.

Testa F., Grappio P., Gusmerotti N.M., Iraldo F., and Frey M. 2016b. Examining green public procurement using content analysis: existing difficulties for procurers and useful recommendations. *Environment, Development and Sustainability* 18(1), pp.197–219.

Testa, F., Iraldo, F., Frey, M., and Daddi, T. 2012. What factors influence the uptake of GPP. (green public procurement) practices? New evidence from an Italian survey. *Ecological Economics* 82, pp.88–96.

The Welsh Audit Office. 2017. Public procurement in Wales (Audit).

Thelen, K. 2004. *Frontmatter.* In: How institutions evolve: The political economy of skills in Germany, Britain, the United States and Japan. Cambridge Studies in comparative politics pp. I-viii. Cambridge: Cambridge University Press.

Thompson, F.J. 1976. Minority Groups in Public Bureaucracies. *Administration & Society* 8(2), pp.201–226.

Thomson, J., and Jackson, T. 2007. Sustainable procurement in practice: lessons from local government. *Journal of Environmental Planning and Management* 50(3), pp.421-444.

Thornton, P. H. and Ocasio, W. 1999. Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry,

Tikkanen, I. 2014. Procurement and consumption of local and organic food in the catering of a rural town. *British Food Journal* 116(3), pp.419-430.

Tolbert, P.S., and Zucker L.G. 1996. Institutionalization of institutional theory. In S. Clegg, C. Hardy, & W. Nord (Eds.), *Handbook of organizational studies.* London: Sage. pp. 175–190.

Touboulic, A. 2015. Exploring how to manage supply chain relationships for sustainability: An Action Research Project with PepsiCo and their Agricultural Suppliers in the UK. PhD Thesis, Cardiff University.

Touboulic, A., and Walker, H. 2015. Theories in sustainable supply chain management: a structured literature review. *International Journal of Physical Distribution & Logistics Management* 45(1/2), pp.16-42.

Tovey, A. 2016. *Closure of Tata Steel's Port Talbot could trigger 20 years of unemployment for local economy.* [Online]. Available at: http://www.telegraph.co.uk/business/2016/04/07/closure-of-tata-steels-port-talbot-could-trigger-20-years-of-une/ [Accessed 01 September 2017].

Tranfield, D., Denyer, D., and Smart, P. 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management* 14(3), pp.207-222.

Trindade, P.C., Antunes, P., and Partidário, P. 2017. SPP. toolbox: Supporting sustainable public procurement in the context of socio-technical transitions. *Sustainability (Switzerland)* 1(67), pp.1-26.

Trionfetti, F. 2000. Discriminatory public procurement and international trade. *World Economy* 23, pp.57–76.

Tsai, W.T. 2017. Green public procurement and green-mark products strategies for mitigating greenhouse gas emissions—experience from Taiwan. *Mitigation and Adaptation Strategies for Global Change* 22(5), pp.729-742.

UK Climate Projections. 2009. Report and guidance. [Online]. Available at: http://ukclimateprojections.metoffice.gov.uk/22530 [Accessed 14 August 2015].

United Nations. 1992. United Nations Conference on Environment & Development Rio de Janerio, Brazil. Agenda 21. [Online]. Available at: https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf [Accessed 15 January 2014]

UN. 1997. United Nations Conference on Environment and development. [Online]. Available at: http://www.un.org/geninfo/bp/enviro.html [Accessed 20 January 2017].

UN. 2010. Preparatory Committee for the United Nations Conference on Sustainable Development. [Online]. Available at: http://www.un-documents.net/aconf216pc2.pdf [Accessed 05 April 2016].

UN. 2018. Climate Change. [Online]. Available at: http://www.un.org/en/sections/issues-depth/climate-change/index.html [Accessed 15 June 2018]

UNEP. 2013. *Sustainable Public Procurement: A Global Review*. United Nations Environment Programme. [Online]. Available at: http://www.scpclearinghouse.org/upload/publication_and_tool/file/437.pdf. [Accessed 15 June 2017].

UNFCCC. 2018. The Kyoto Protocol - Status of Ratification. [Online]. Available at: https://unfccc.int/process/the-kyoto-protocol/status-of-ratification [Accessed 12 March 2018].

Unison. 2013. *Procurement in Wales – Factsheet.* [Online]. Available at: https://www.unison.org.uk/content/uploads/2013/06/On-line-Catalogue183633.pdf [Accessed 01 June 2015].

United Nations. 1972. *Declaration of the United Nations Conference on the Human Environment, Stockholm, 16 June 1972.* [Online]. Available at: http://www.unep.org/Documents/Default.asp?DocumentID¼97&ArticleID¼1503 [Accessed 13 April 2015].

United Nations. 1992. "United Nations framework convention on climate change." [Online]. Available at: https://unfccc.int/files/essential_background/background_publications_htmlpdf/app.lication/pdf/conveng.pdf [Accessed 15 January 2017].

United Nations Climate Change. 2018. The Paris Agreement. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [Accessed 30 October 2018]

United Nations Conference on Environment and Development (UNCED). 1992. U.N. Doc. A/Conf. 252/5, 13 June.

United Nations Framework Convention on Climate Change. 2011. *Fact sheet: Climate change science - the status of climate change science today.* [Online]. Available at: https://unfccc.int/files/press/backgrounders/app.lication/pdf/press_factsh_science.pdf [Accessed 25 August 2017].

United States Environmental Protection Agency. 2018. *Global Greenhouse Gas Emissions Data*. [Online]. Available at: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data [Accessed 18 March 2018].

University College of Swansea. 1970. *Guide to the archive collections relating to south Wales coal-field.* Swansea: University College of Swansea Library.

U.S. President's Council on Sustainable Development. 1994. *A vision for a sustainable U.S. and principles of sustainable development.* Washington, DC: U.S. President's Council on Sustainable Development.

Uttam, K., and Roos, C.L.L. 2015. Competitive dialogue procedure for sustainable public procurement. *Journal of Cleaner Production* 86, pp.403-416.

Van de Ven, A.H. 1989. Nothing is quite so practical as a good theory. *Academy of Management Review* 14(4), pp.486-489.

Van Riper, P. 1958. *History of the United States civil service.* New York, New York: Harper and Row.

Varnas, A., Balfors, B., and Faith-Ell, C. 2009. Environmental consideration in procurement of construction contracts: current practice, problems and opportunities in green procurement in the Swedish construction industry. *Journal of Cleaner Production* 17(13), pp.1214–1222.

Viederman, S. 1994. *The economics of sustainability: Challenges. Paper presented at the workshop on the Economics of Sustainability.* Fundacao Joaquim Nabuco, Recife, Brazil. Sept 13-15.

Vindrola-Padros, C., Paper, T., Utley, M., and Fulop, N. 2016. The role of embedded research in quality improvement: a narrative review. *BMJ Quality Safety* 26, pp.70-80.

Voinov, A., and Farley, J. 2007. Reconciling sustainability, systems theory and discounting. *Ecological Economics* 63(1), pp.104-113.

Vos, R.O. 1997. Competing approaches to sustainability: dimensions of controversy. In: Kamieniecki, S., Gonzalez, G. A. and Vos, R. O. eds. *Flashpoints in environmental policymaking: Controversies in achieving sustainability*. Albany, New York: State University of New York Press, pp.1–27.

Vos, R.O. 2007. Perspective defining sustainability: a conceptual orientation. *Journal of Chemical Technology and Biotechnology* 82, pp.334–339.

Wackernagel, M., and Rees, W.E. 1996. *Our ecological footprint: reducing human impact on the earth.* Philadelphia, PA: New Society Publishers.

Wales Governance Centre at Cardiff University. 2016. *Government expenditure and revenue Wales 2016.* [Online]. Available at: http://sites.cardiff.ac.uk/WAGc/files/2016/04/Government-Expenditure-and-Revenue-Wales-2016.pdf [Accessed 20 January 2017].

Walker, H., and Brammer, S. 2009. Sustainable procurement in the United Kingdom public sector. *Supply Chain Management: An International Journal* 14(2), pp.128–137.

Walker, H., and Brammer, S. 2012. The relationship between sustainable procurement and e-procurement in the public sector. *International Journal of Production Economics* 140, pp.256–268.

Walker, H., and Preuss, L. 2008. Fostering sustainability through sourcing from small businesses: public sector perspectives. *Journal of Cleaner Production* 16(15), pp.1600-1609.

Walker, H., Radnor, Z., Chicksand, D., and Watson, G. 2015. Theoretical perspectives in operations management: an analysis of the literature. *International Journal of Operations and Production Management* 35(8), pp.1182-1206.

Walliman, N. 2006. *Social Research Methods*. London: Sage.

Wang, C.Q., Hong, J.J., Kafouros, M., and Boateng, A. 2012. What drives outward FDI of Chinese firms? Testing the explanatory power of three theoretical frameworks. *International Business Review* 21, pp.425-438.

Warner, K.E., and Ryall, C. 2001. Greener purchasing activities within UK local authorities. *Eco-Management Auditing* 45, pp.36-45.

Well-being of Future Generation (Wales) Act 2015. [Online]. Available at: http://www.legislation.gov.uk/anaw/2015/2/contents/enacted [Accessed 01 September 2017].

Weiss, L., and Thurbon, E. 2006. The business of buying American: public procurement as trade strategy in the USA. *Review of International Political Economy* 13(5), pp.701–724.

Weitzman, M. L. 1997. Sustainability and technical progress. *Scandinavian Journal of Economics* 99(1), pp.1-13.

Welsh Assembly Government. 2004. Starting to Live Differently. [Online]. Available at: http://webarchive.nationalarchives.gov.uk/20080107224105/http://new.wales.gov.uk/topics/sustainabledevelopment/publications/startlivedifferently/?lang=en [Accessed 01 March 2015]

Welsh Assembly Government. 2008. *Procurement and the Third Sector: Guidance for the Public Sector in Wales, March 2008.* [Online]. Available at: https://www.c3sc.org.uk/partnerships/partnerships-doc lib/commissioning/147-procurement-and-the-third-sector-guidance-for-the-public-sector-in-wales/file [Accessed 26 January 2017].

Welsh Assembly Government. 2010. *Towards Zero Wales*. [Online]. Available at: https://gov.wales/docs/desh/publications/100621wastetowardszeroen.pdf [Accessed 16 September 2017].

Welsh Assembly Government. 2012. *Wales Procurement Policy Statement*. [Online]. Available at: http://gov.wales/docs/prp/toolkit/june15walesprocurementpolicystatement2015v1.pdf [Accessed 15 January 2017].

Welsh Assembly Government. 2016a. *How to measure a nation's progress? National indicators for Wales.* [Online]. Available at: https://gov.wales/docs/desh/publications/160316-national-indicators-to-be-laid-before-nafw-en.pdf [Accessed 13 June 2017].

Welsh Assembly Government. 2016b. *Statistical First Release. Size analysis of Welsh Businesses.* Statistics for Wales. [Online]. Available at: https://gov.wales/docs/statistics/2017/171221-size-analysis-welsh-business-2017-en.pdf [Accessed 25 March 2015]

Welsh Assembly Government. 2017. Regional gross value added (GVA) and sub-regional gross value added. [Online]. Available at: https://gov.wales/statistics-and-research/regional-gross-value-added-sub-regional-gross-value-added/?lang=en [Accessed 11 January 2018].

Welsh Government. 1985. Digest of Welsh Historical Statistics 1700-1974: Chapter 5 - Coal. [Online]. Available at: http://gov.wales/statistics-and-research/digest-welsh-historicalstatistics/?tab=previous&lang=en [Accessed 24 April 2018].

Welsh Government. 2015. *Wales Procurement Policy Statement.* [Online]. Available at: http://gov.wales/docs/prp/toolkit/june15walesprocurementpolicystatement2015v1.pdf [Accessed 01 September 2017].

Welsh Government. 2017. *History of Wales*. [Online]. Available at: http://www.wales.com/history_timeline [Accessed 01 September 2017].

Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal* 5(2), pp.171-180.

Weybrecht, G. 2010. *The Sustainable MBA: The Manager's Guide to Green Business*. Chichester: Wiley.

Williams, P. 2006. The governance of sustainable development in Wales. *Local Environment* 11(3), pp.253-267.

Wissenburg, M. 2006. Global and ecological justice: prioritizing conflicting demands. *Environmental Values* 15, pp.425-439.

Wong, S. 2008. Tales from the frontline: the experiences of early childhood practitioners working with an 'embedded' research team. *Evaluation and Program Planning* 32(2), pp.99-108.

Wong, J.K.W., Chan, J.K.S., and Wadu, M.J. 2016. Facilitating effective green procurement in construction projects: an empirical study of the enablers. *Journal of Cleaner Production* 135, pp.859-871.

World Atlas. 2017. *Where is Wales, United Kingdom?* [Online]. Available at: http://www.worldatlas.com/eu/gb/wls/awhere-is-wales.html [Accessed 10 February 2017].

World Commission on Environment and Development (WCED). 1987. *Our Common Future*. Oxford: Oxford University Press.

World Summit on Sustainable Development. 2002. *Plan of implementation of the world summit on sustainable development.* New York, New York: United Nations.

Yang J.B., and Chou H.Y. 2017. Key challenges in executing energy-savings performance contracts in public buildings: Taiwan experience. *Journal of the Chinese Institute of Engineers* 40(6) pp.482-491.

Yin, R. 2014. *Case Study Research: Design and Methods.* 5th eds. London: Sage publication.

Zhu, Q., Geng, Y., and Sarkis, J. 2013. Motivating green public procurement in China: An individual level perspective. *Journal of Environmental Management* 126, pp.85-95.

Zhu, Q., and Geng, Y. 2001. Integrating environmental issues into supplier selection and management; a study of large and medium-sized state-owned enterprises in China. *Greener Management International* 35, pp.27-40.

Zhu, Q., and Sarkis, J. 2007. The moderating effects of institutional pressures in emergent green supply chain practices and performance. *International Journal of Production Research* 45, pp.4333–4355.

Zimmermann, B. 2006. Pragmatism and the capability approach. *European Journal of Social Theory* 9(4), pp.467-484.

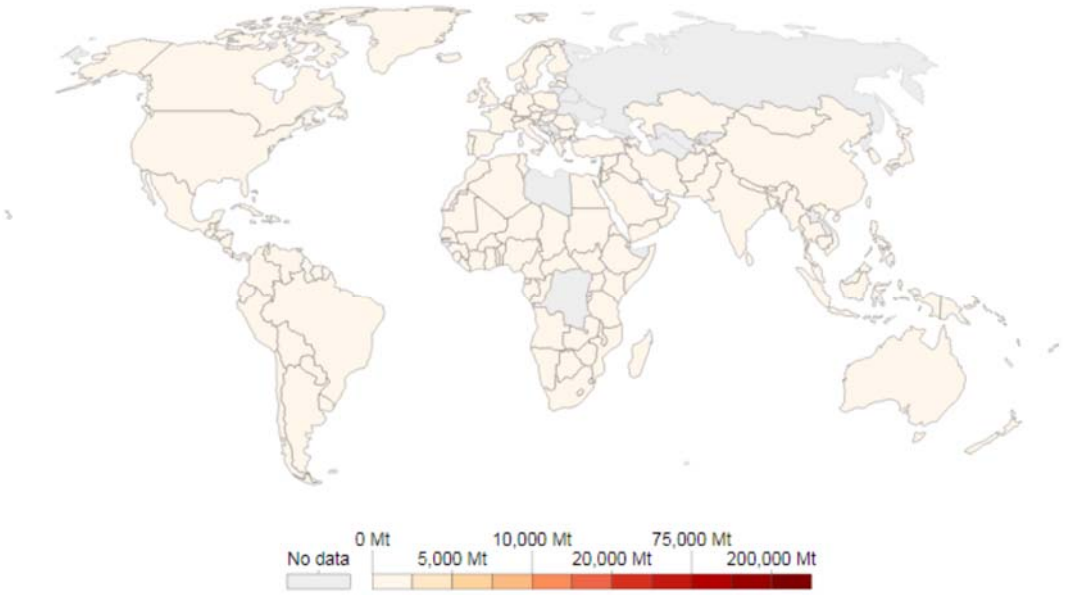
Zucker, L.G. 1977. The role of institutionalization in cultural persistence. *American Sociological Review* 42(5), pp.726-743.

Appendices

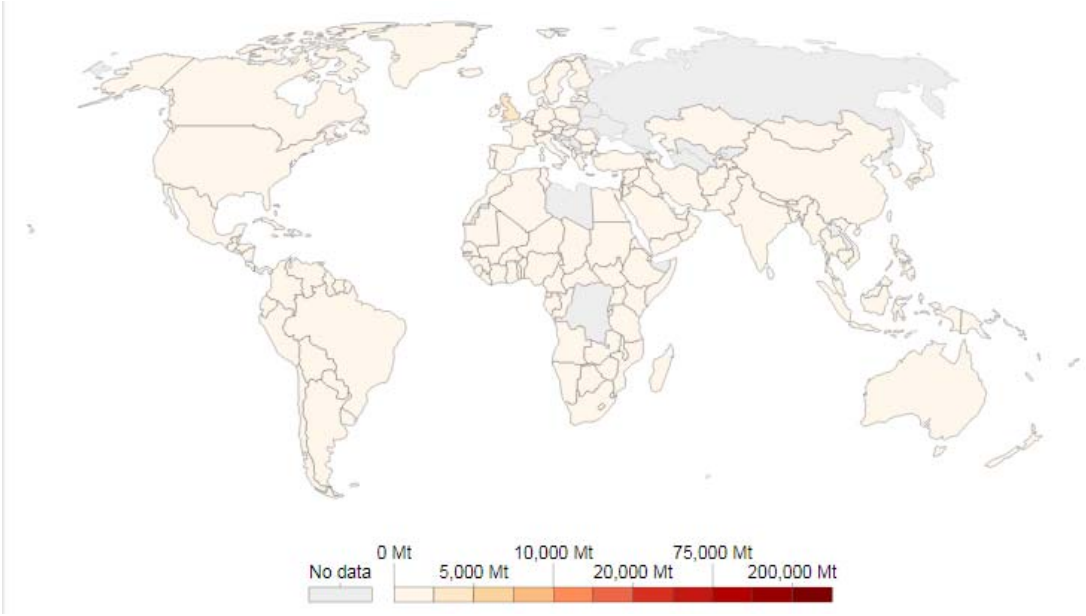
Appendix A: Cumulative carbon dioxide emissions, 1751-2014

Cumulative carbon dioxide (carbon) emissions represents the total sum of CO_2 emissions from 1751-2014 and is measured in million tonnes.
Source: Carbon Dioxide Information Analysis Centre (CDIAC)
Full data can be found at: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

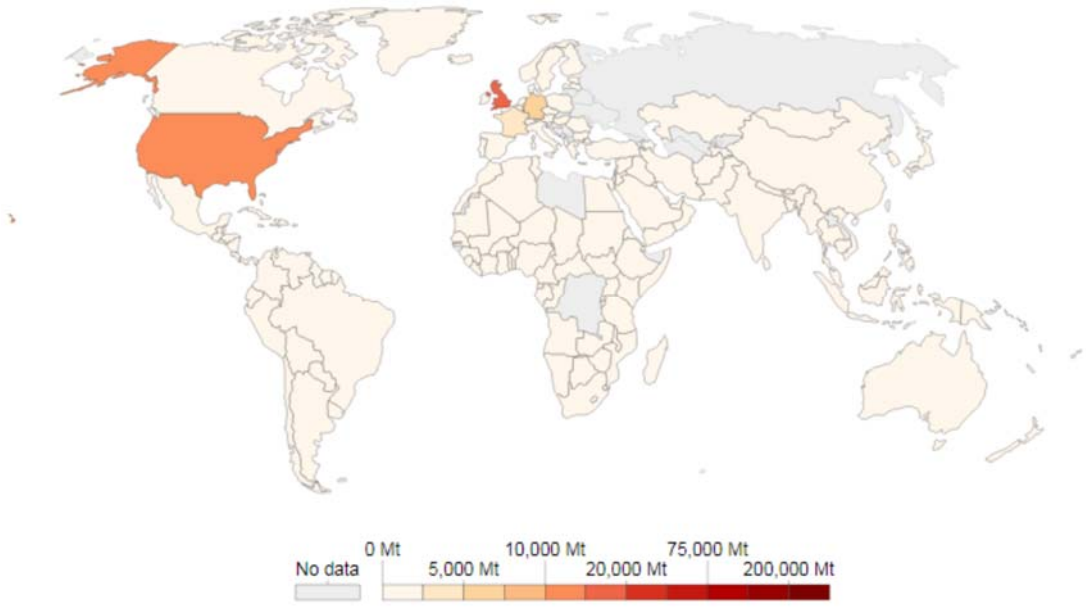
Cumulative CO_2 emissions, 1751 (pre-industrial revolution)



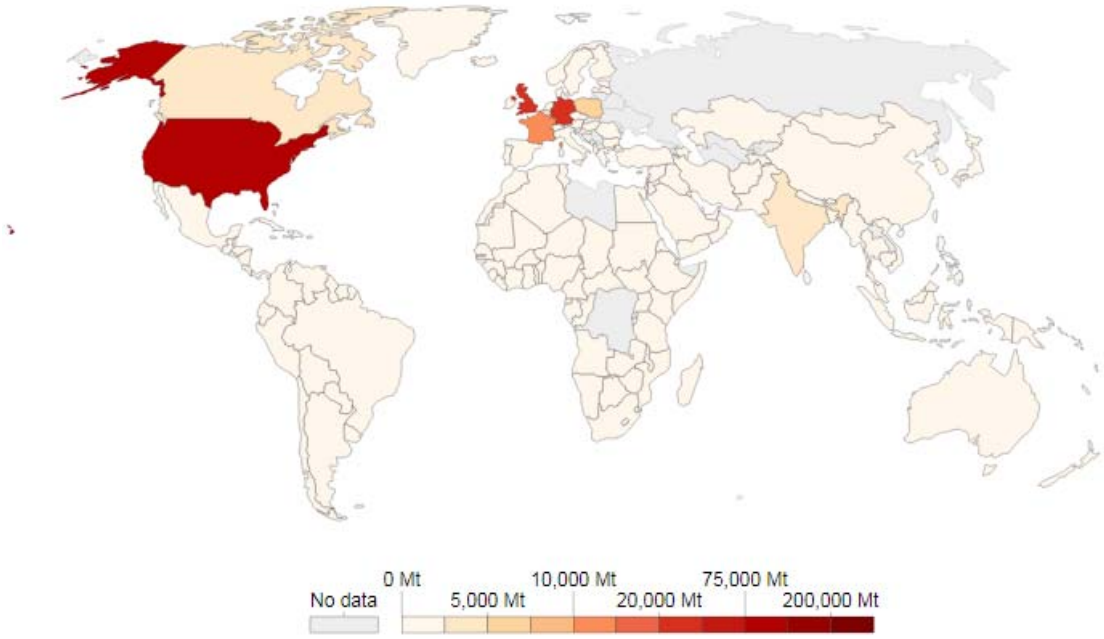
Cumulative CO_2 emissions, 1840 (end of industrial revolution in Wales)



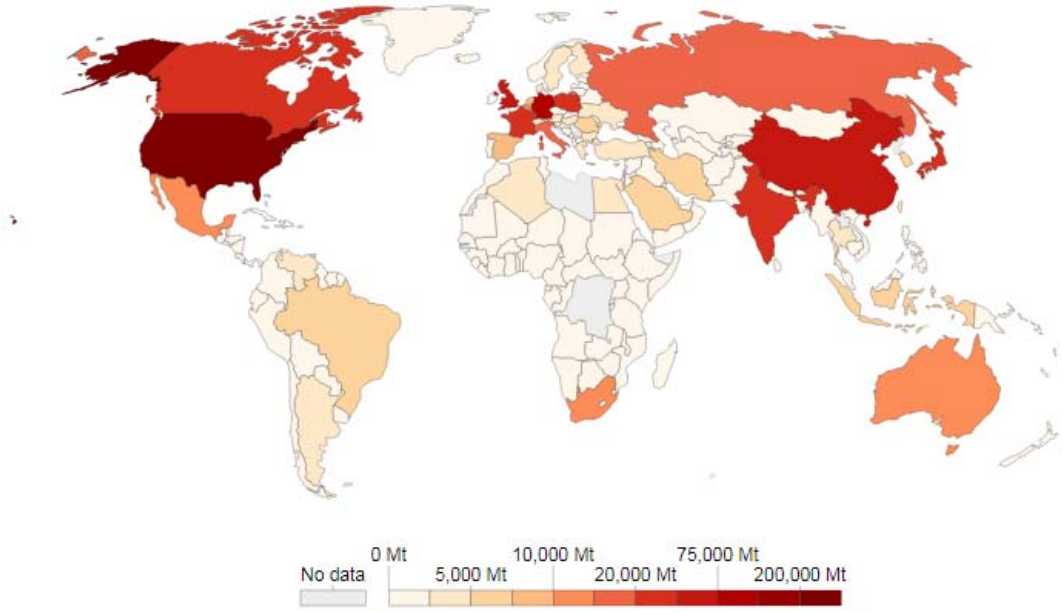
Cumulative CO_2 emissions, 1900



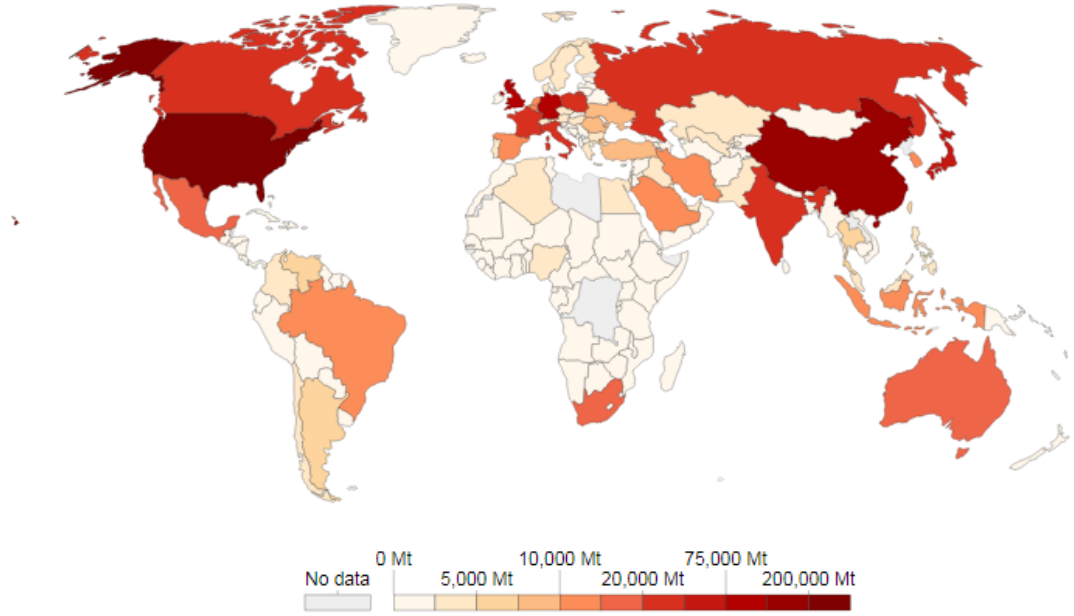
Cumulative CO_2 emissions, 1950



Cumulative CO_2 emissions, 2000



Cumulative CO_2 emissions, 2014



Appendix B: Overview of sectors

	Public Sector	Private	Third
Definition	The part of the national economy that provides goods and/or services to the public. It consists of national and local governments, as well as their various agencies and chartered bodies. They interact with suppliers from the private and third sectors to deliver goods and services.	Part of a country's economic system that is run by individuals and companies. Most private sector organisations are run with the express intention of generating profit.	The UK Government and the WAG define the third sector as non-governmental value-driven organisations which principally reinvest their surpluses to further social, environmental or cultural objectives. It includes voluntary and community organisations, charities, social enterprises, cooperatives and mutuals (WAG 2008).
Objective	• Provide value to the public via services	• Businesses for profit and shareholders	• Advocacy services • Policy campaigns • Run services on behalf of public/public sector • Carry out or fund scientific/quantitative research
Departments/ Industry	• Heath and Social Services • Local Government • Education and Skills • Economy, Science and Transport • Communities and tackling Poverty • Natural Resources • Central Administration	• Agriculture, Forestry and fishing • Production • Construction • Wholesale, retail, transport, hotels, food and communication • Financial and business Services • Private sector health and education • Other services	Voluntary organisations, community groups, volunteers, self-help groups, community co-operatives and enterprises, religious organisations and other not-for-profit organisations. 87% are local, working within the local authority.
Number of Departments/ Organisations	7 in total, each of which have their own sub-hierarchies.	Micro (0-9 employees) Small (10-49 employees) Medium (50-249 employees) Larger (250+) 250,100 organisations (WAG 2016)	30,000 organisations (WAG 2008)
Characteristics	Operating sustainability procurement policy. Suppliers are private and third sector organisations.	More Micro businesses in Wales (employees 0-9, 49.2%). Larger organisations have higher turnover.	Funded from a change of sources including public funds, grants and charitable donations.
Spend	£5.5 Billion (on goods and services).	-	-
Turnover/ Income	-	£117 billion (Welsh Government 2016)	£1.2 billion in total (WAG 2008). However, 65% with income below £10,000. £71.45 million (2014-15) from Welsh government alone.
Lead bodies	Welsh government (and departments)	Federation of Small Business (SMEs), CBI	Welsh Council of Voluntary Action (WCVA)

Key Sources: NAO (2010), Welsh Government (2016b) WAG (2008)

Appendix C: Cycle One: Interview protocol

Introduction
Welcome participant. Provide overview of research.

Background
Can you please give me an overview of your role and your organisation?
Explore job role, organisation size, number of employees, location, structure and operation.
Establish if participant is either a procurer or in place to support procurers in a sector, frame questions accordingly.
Purchasing information: product/service portfolio purchased by the organisation, total spend each category, supply market engaged with.

Procurement
Could you talk me through the procurement processes that you/the sector follows?
Explore: Size of purchases, Variation in processes, Products and services purchased.

Can you tell me more about how procurement decisions are made?
Explore: Who is involved, Interaction internally, Supplier interaction, etc.

Sustainable Procurement/LCP
How does your organisation/the sector approach sustainable procurement?
What is your/the sector's understanding of LCP?
How would you define LCP?

Could you tell me about how carbon is currently considered (if at all) within the procurement process?
Explore: Procurement policy, Processes/rules, Procurement tools, Guidelines, Procedures, Contract/framework requirements.

Can you tell me about any information requested/obligations made with suppliers during procurement to support LCP?
Explore: Certification (ask for examples, explore how carbon is covered within them), Carbon management, Contract requirements.

How would you describe your/the sector's experience of using tools and procedures?
Explore: Challenges/difficulties faced. What enabled LCP? Ask for examples.

Future plans
Explore future plans (if any) for managing carbon via procurement
Perceived barriers and constraints to those plans.

Appendix D: Procurement cycle

The diagram below outlined a typical procurement cycle from beginning to end.

Typical Procurement cycle

Source: UNEP (2013)

Appendix E: SPP papers from SLR (107 papers)

1. Murray, J.G. 2000. Effects of a green purchasing strategy: the case of Belfast City Council. *Supply Chain Management: An International Journal*. 5(1), pp.37-44.
2. Warner, K.E., and Ryall, C. 2001. Greener purchasing activities within UK local authorities. *Eco-Management Auditing.* 45, pp.36-45.
3. Zhu, Q., and Geng, Y. 2001. Integrating environmental issues into supplier selection and management; a study of large and medium-sized state-owned enterprises in China. *Greener Management International.* 35, pp.27-40.
4. Coggburn, J.D. 2004. Achieving managerial values through green procurement? *Public Performance & Management Review.* 28(2), pp.236-258.
5. McCrudden, C. 2004. Using public procurement to achieve social outcomes. *Natural Resources Forum.* 28 pp.257–267.
6. Faith-Ell, C. 2005. The introduction of environmental requirements for trucks and construction vehicles used in road maintenance contracts in Sweden. *Corporate Social Responsibility and Environmental Management.* 12, pp.62–72.
7. Li, L., and Geiser K. 2005. Environmentally responsible public procurement (ERPP) and its implications for integrated product policy (IPP). *Journal of Cleaner Production.* 13, pp.705-715.
8. Swanson, M., Weissman, A., Davis, G., Socolof, M.L., and Davis, K. 2005. Developing priorities for greener state government purchasing: a California case study. *Journal of Cleaner Production.* 13(7), pp.669-677.
9. Asselt, H.V., Grijp, N.V.D., and Oosterhuis, F. 2006. Greener public purchasing: Opportunities for climate-friendly government procurement under WTO and EU rules. *Climate Policy.* 6(2), pp.217-229.
10. Günther E., and Scheibe L. 2006. The hurdle analysis. A self-evaluation tool for municipalities to identify, analyse and overcome hurdles to green procurement. *Corporate Social Responsibility and Environmental Management.* 13, pp.61–77.
11. Borg N., Blume Y., Thomas S., Irrek W., Faninger-Lund H., Lund P., and Pindar A. 2006. Release the power of the public purse. *Energy Policy.* 34(2), pp.238-250.
12. Faith-Ell, C., Balfors, B., and Folkeson, L. 2006. The application of environmental requirements in Swedish road maintenance contracts. *Journal of Cleaner Production.* 14, pp.163-171.
13. Hall, M., and Purchase, D. 2006. Building or bodging? Attitudes to sustainability in UK public sector housing construction development. *Sustainable Development.* 14, pp.205–218.
14. Hochschorner E., and Finnveden G. 2006. Life cycle approach in the procurement process: The case of defence materiel. *International Journal of Life Cycle Assessment.* 11(3), pp.200-208.
15. Rimmington, M., Smith, J.C., and Hawkins, R. 2006. Corporate social responsibility and sustainable food procurement. *British Food Journal.* 108(10), pp.824-837.
16. Erridge, A. 2007. Public procurement, public value and the Northern Ireland unemployment pilot project. *Public Administration*. 85(4), pp.1023 - 1043
17. Dawson, G.F., and Probert, E.J.D. 2007. A sustainable product needing a sustainable procurement commitment: the case of green waste in Wales. *Sustainable Development.* 15(2), pp.69-82.
18. Preuss, L. 2007. Buying into our future: sustainability initiatives in local government procurement. *Business Strategy and the Environment.* 16(5), pp.354–365.
19. Thomson, J., and Jackson, T. 2007. Sustainable procurement in practice: lessons from local government. *Journal of Environmental Planning and Management.* 50(3), pp.421-444.

20. Bala, A., Munoz, P., Rieradevall, J., and Ysern, P. 2008. Experiences with greening suppliers. The universitat autonoma de Barcelona. *Journal of Cleaner Production.* 16(15), pp.1610–1619.
21. Bolton P. 2008. Protecting the environment through public procurement: The case of South Africa. *Natural Resources Forum.* 32, pp.1–10.
22. Geng, Y., and Doberstein, B. 2008. Greening government procurement in developing countries: building capacity in China. *Journal of Environmental Management.* 88(4), pp.932-938.
23. Parikka-Alhola K. 2008. Promoting environmentally sound furniture by green public procurement. *Ecological Economics.* 68(1-2), pp.472- 485.
24. Walker, H., and Preuss, L. 2008. Fostering sustainability through sourcing from small businesses: public sector perspectives. *Journal of Cleaner Production.* 16(15), pp.1600-1609.
25. Nash H.A. 2009. The European Commission's sustainable consumption and production and sustainable industrial policy action plan. *Journal of Cleaner Production.* 17(4), pp.496–498
26. Nissinen A., Parikka-Alhola K., and Rita H. 2009. Environmental criteria in the public purchases above the EU threshold values by three Nordic countries: 2003 and 2005. *Ecological Economics.* 68(6), pp.1838-1849.
27. Michelsen O., and de Boer L. 2009. Green procurement in Norway; a survey of practices at the municipal and county level. *Journal of Environmental Management*. 91(1), pp.160-167.
28. Preuss L. 2009. Addressing sustainable development through public procurement: The case of local government. *Supply Chain Management: An International Journal.* 14(3), pp.213-223.
29. Rolfstam M. 2009. Public procurement as an innovation policy tool: The role of institutions. *Science and Public Policy.* 36(5), pp.349–360.
30. Sonnino R. 2009. Quality food, public procurement, and sustainable development: The school meal revolution in Rome. *Environment and Planning A.* 41, pp.425-440.
31. Sporrong J., and Bröchner J. 2009. Public procurement incentives for sustainable design services: Swedish experiences. *Architectural Engineering and Design Management.* 5(1-2), pp.24-35.
32. Varnas, A., Balfors, B., and Faith-Ell, C. 2009. Environmental consideration in procurement of construction contracts: current practice, problems and opportunities in green procurement in the Swedish construction industry. *Journal of Cleaner Production.* 17(13), pp.1214–1222.
33. Walker H., and Brammer S. 2009. Sustainable procurement in the United Kingdom public sector. *Supply Chain Management: An International Journal.* 14(2), pp.128 – 137.
34. Ho L.W., Dickinson N.M., and Chan G.Y. 2010. Green procurement in the Asian public sector and the Hong Kong private sector. *Natural Resources Forum.* 34(1), pp.24–38.
35. Molenaar, K.R., Sobin, N., and Antillon, E.I. 2010. A synthesis of best-value procurement practices for sustainable design-build projects in the public sector. *Journal of Green Building.* 5(4), pp.148-157.
36. Palmujoki A., Parikka-Alhola K., and Ekroos A. 2010. Green public procurement: Analysis on the use of environmental criteria in contracts. *Review of European Community and International Environmental Law.* 19(2), pp.250-262.
37. Smith, C.R., and Fernandez, S. 2010. Equity in federal contracting: examining the link between minority representation and federal procurement decisions. *Public Administration Review.* 70(1), pp.87-96.

38. Brammer S., and Walker H. 2011. Sustainable procurement in the public sector: An international comparative study. *International Journal of Operations and Production Management.* 31(4), pp.452-476.
39. Fet A., and Michelsen O., Boer L. 2011. Green public procurement in practice - The case of Norway. *Society and Economy.* 33(1), pp.183–198.
40. Meehan, J., and Bryde, D. 2011. Sustainable procurement practice. *Business Strategy and the Environment.* 20, pp. 94–106
41. Preuss, L., and Walker, H. 2011. Psychological barriers in the road to sustainable development: evidence from public sector procurement. *Public Administration: An international quarterly.* 89(2), pp.493–521.
42. Burchard-Dziubiñska M., and Jakubiec T. 2012. Green Public Procurements (GPP) as an Instrument of Implementation of Sustainable Development. Analysis of the Experience of the Lodz Region Local Government. *Comparative Economic Research.* 15(3), pp.23-36.
43. Erridge A., and Hennigan S. 2012. Sustainable procurement in health and social care in Northern Ireland. *Public Money and Management.* 32(5), pp.363-370.
44. Nijaki L.K., and Worrel G. 2012. Procurement for sustainable local economic development. *International Journal of Public Sector Management.* 25(2), pp.133-153.
45. Oruezabala G., and Rico J. 2012. The impact of sustainable public procurement on supplier management - The case of French public hospitals. *Industrial Marketing Management.* 41(4), pp.573-580.
46. Parikka-Alhola K., and Nissinen A. 2012. Environmental impacts of transport as award criteria in public road construction procurement. *International Journal of Construction Management*. 12(2), pp.35-49.
47. Steurer, R., Martinuzzi A., and Margula S. 2012. Public Policies on CSR in Europe: Themes, Instruments, and Regional Differences. *Corporate Social Responsibility and Environmental Management.* 19(4), pp.206-227.
48. Testa F., Iraldo F., Frey M., and Daddi T., and 2012. What factors influence the uptake of GPP (green public procurement) practices? New evidence from an Italian survey. *Ecological Economics.* 82, pp.88–96.
49. Walker H., and Brammer S. 2012. The relationship between sustainable procurement and e-procurement in the public sector. *International Journal of Production Economics.* 140, pp.256–268.
50. Akenroye T.O. 2013. An appraisal of the use of social criteria in public procurement in Nigeria. *Journal of Public Procurement.* 13(3), pp.364-397.
51. Akenroye T.O., Oyegoke A.S., and Eyo A.B. 2013. Development of a framework for the implementation of green public procurement in Nigeria. *International Journal of Procurement Management*. 6(1), pp.1-23.
52. Bratt C., Hallstedt S., Robèrt K.H., Broman G., Oldmark J. and 2013. Assessment of criteria development for public procurement from a strategic sustainability perspective. *Journal of Cleaner Production.* 52, pp.309-316.
53. Correia F., Howard M., Hawkins B., Pye A., and Lamming R. 2013. Low carbon procurement: An emerging agenda. *Journal of Purchasing and Supply Management.* 19, pp.58–64.
54. Guenther, E., Hueske, A.K., Stechemesser, K., and Buscher, L. 2013. The 'why not' perspective of green purchasing: a multilevel case study analysis. *Journal of Change Management.* 50(3), pp.407-423.
55. Loader, K. 2013. Is public procurement a successful small business support policy? A review of the evidence. *Environment and Planning C: Government and Policy.* 31(1), pp.39-55.

56. Sourani A., and Sohail M. 2013. Enabling sustainable construction in UK public procurement. Proceedings of Institution of Civil Engineers. *Management, Procurement and Law.* 166(MP6), pp.297-312.
57. Zhu Q., Geng Y., and Sarkis J. 2013. Motivating green public procurement in China: An individual level perspective. *Journal of Environmental Management.* 126, pp.85-95.
58. Amann M., Roehrich J.K., Eßig M., and Harland C. 2014. Driving sustainable supply chain management in the public sector: The importance of public procurement in the European Union*. Supply Chain Management: An International Journal.* 19(3), pp.351-366.
59. Diófási O., and Valkó L. 2014. Step by step towards mandatory green public procurement. *Periodica Polytechnica Social and Management Sciences.* 22(1), pp.21-27.
60. Kanapinskas, V., Plytnikas, Ž., and Tvaronavičienė, A. 2014. Sustainable public procurement: Realization of the social aspect in Republic of Lithuania. *Business: Theory and Practice.* 15(4), pp.302–315
61. McMurray, A.J., Islam, M.M., Siwar, C., and Fien, J. 2014. Sustainable procurement in Malaysian organizations: practices, barriers and opportunities. *Journal of Purchasing and Supply Management.* 20(3), pp.195-207.
62. Rizzi. F, Frey M., and Testa F., and Appolloni A. 2014. Environmental value chain in green SME networks: The threat of the Abilene paradox. *Journal of Cleaner Production.* 85, pp.265-275.
63. Tikkanen I. 2014. Procurement and consumption of local and organic food in the catering of a rural town. *British Food Journal.* 116(3), pp.419-430.
64. Diófási-Kovács O., and Valkó L. 2015. Furthering sustainable development: The implementation of green procurement in Central and Eastern Europe: Methods and experiences from Hungarian public and private organizations. *Problems of Sustainable Development.* 10(2), pp.115-126.
65. Gelderman C.J., Semeijn J., and Bouma F. 2015. Implementing sustainability in public procurement: The limited role of procurement managers and party- political executives*. Journal of Public Procurement.* 15(1), pp.66-92.
66. Grandia J. 2015a. The role of change agents in sustainable public procurement projects. *Public Money and Management.* 35(2), pp.119-126.
67. Grandia J., Steijn B., and Kuipers B. 2015b. It is not easy being green: increasing sustainable public procurement behaviour. *Innovation: The European Journal of Social Science Research.* 28(3), pp.243–260.
68. Igarashi M., De Boer L., and Michelsen O. 2015. Investigating the anatomy of supplier selection in green public procurement. *Journal of Cleaner Production*. 108, pp.442-450.
69. Kleine D., and Brightwell M.D.G. 2015. Repoliticising and scaling-up ethical consumption: Lessons from public procurement for school meals in Brazil. *Geoforum.* 67, pp.135–147.
70. Nikolaou I.E., and Loizou C. 2015. The Green Public Procurement in the midst of the economic crisis: is it a suitable policy tool? *Journal of Integrative Environmental Sciences.* 12(1), pp.49-66.
71. Uttam K., and Roos, C.L.L. 2015. Competitive dialogue procedure for sustainable public procurement. *Journal of Cleaner Production.* 86, pp.403-416.
72. Chiarini A., and Vagnoni E. 2016. Environmental sustainability in European public healthcare: Could it just be a matter of leadership? *Leadership in Health Services.* 29(1), pp.2-8.

73. Grandia J. 2016. Finding the missing link: Examining the mediating role of sustainable public procurement behaviour. *Journal of Cleaner Production*. 124, pp.183-190.
74. Hall P., Löfgren K., and Peters G. 2016. Greening the Street-Level Procurer: Challenges in the Strongly Decentralized Swedish System. *Journal of Consumer Policy*. 39(4), pp.467–483.
75. Hou F.M., and Cai T. 2016. Effects of forest products green public procurement on China: Based on cost-benefit analysis and survey. *Journal of Mechanical Engineering Research and Developments.* 39(4), pp.1060-1066.
76. Iraldo F., Nucci B., and De Giacomo M.R. 2016. The relevance of life cycle costing in green public procurement. *Economics and Policy of Energy and the Environment.* 1, pp.91-109.
77. Jaafar M.R., Aziz S.A., and Ramli N.M. 2016. The roles of compliance with government procurement policy: Moderating the effects between explanatory factors and sustainable public procurement practice. *Jurnal Pengurusan (UKM Journal of Management).* 48, pp.89-98.
78. Offei I., Kissi E., and Badu, E. 2016. Public procurement policies and strategies for capacity building of SME construction firms in Ghana. *International Journal of Procurement Management.* 9(4), pp.455-472.
79. Pacheco-Blanco B., and Bastante-Ceca M.J. 2016. Green public procurement as an initiative for sustainable consumption. An exploratory study of Spanish public universities. *Journal of Cleaner Production.* 133(1), pp.648-656.
80. Pirvu, D., and Clipici, E. 2016. Social Enterprises and the EU's Public Procurement Market. *VOLUNTAS: International Journal of Voluntary and Non-profit Organizations.* 27(4), pp.1611–1637.
81. Prier, E., Schwerin, E., and McCue, C.P. 2016. Implementation of sustainable public procurement practices and policies: A sorting framework. *Journal of Public Procurement.* 16(3), pp.312-346.
82. Smith J., Andersson G., Gourlay R., Karner S., Mikkelsen B.E., Sonnino R., and Barling D. 2016. Balancing competing policy demands: The case of sustainable public sector food procurement. *Journal of Cleaner Production.* 112(1), pp.249-256.
83. Štofová L., and Szaryszová P. 2016. Environmental criteria of public procurement as a tool of development sustainability. *Quality - Access to Success.* 17(152), pp.67-70.
84. Testa F., Annunziata E., Iraldo F., and Frey M. 2016a. Drawbacks and opportunities of green public procurement: An effective tool for sustainable production. *Journal of Cleaner Production.* 112(3), pp.1893-1900.
85. Testa F., Grappio P., Gusmerotti N.M., Iraldo F., and Frey M. 2016b. Examining green public procurement using content analysis: existing difficulties for procurers and useful recommendations. *Environment, Development and Sustainability.* 18(1), pp.197–219.
86. Wong, J.K.W., Chan, J.K.S., and Wadu, M.J. 2016. Facilitating effective green procurement in construction projects: an empirical study of the enablers. *Journal of Cleaner Production.* 135, pp.859-871.
87. Ahsan K., and Rahman S. 2017. Green public procurement implementation challenges in Australian public healthcare sector. *Journal of Cleaner Production.* 152, pp.181-197.
88. Aldenius M., and Khan J. 2017. Strategic use of green public procurement in the bus sector: Challenges and opportunities. *Journal of Cleaner Production.* 164, pp.250-257.
89. Chiarini A., Opoku A., and Vagnoni E. 2017. Public healthcare practices and criteria for a sustainable procurement: A comparative study between UK and Italy. *Journal of Cleaner Production.* 162, pp.391-399.

90. Fuentes-Bargues J.L., González-Cruz M.C., González-Gaya C. 2017. Environmental criteria in the Spanish public works procurement process. *International Journal of Environmental Research and Public Health.* 14(2), pp.204-222.
91. Gelderman C.J., Semeijn J., and Vluggen R. 2017. Development of sustainability in public sector procurement. *Public Money and Management.* 37(6), pp.435-442.
92. Glas A.H., Schaupp M., and Essig M. 2017. An organizational perspective on the implementation of strategic goals in public procurement. *Journal of Public Procurement.* 17(4), pp.572-605.
93. Hueskes M., Verhoest K., and Block T. 2017. Governing public–private partnerships for sustainability: An analysis of procurement and governance practices of PPP infrastructure projects. *International Journal of Project Management.* 35(6), pp.1184-1195.
94. Igarashi M., de Boer L., Pfuhl G. 2017. Analyzing buyer behavior when selecting green criteria in public procurement. *Journal of Public Procurement.* 17(2), pp.141-186.
95. Keulemans S., and Walle S.V.D. 2017. Cost-effectiveness, domestic favouritism and sustainability in public procurement: A comparative study of public preferences. *International Journal of Public Sector Management.* 30(4), pp.328-341.
96. Kordestani, A., Sattari, S., Peighambari, K., and Oghazi, P. 2017. Exclude me not: The untold story of immigrant entrepreneurs in Sweden. *Sustainability.* 9(9), pp.1-22.
97. Leiser, M.S., and Wolter, S.C. 2017. Empirical Evidence on the Effectiveness of Social Public Procurement Policy: The Case of the Swiss Apprenticeship Training System. *Labour.* 31(2), pp.204-222.
98. Meehan J., Menzies L., Michaelides R. 2017. The long shadow of public policy; Barriers to a value-based approach in healthcare procurement. *Journal of Purchasing and Supply Management.* 23(4), pp.229-241.
99. Palm J., and Backman F. 2017. Public procurement of electric vehicles as a way to support a market: Examples from Sweden. *International Journal of Electric and Hybrid Vehicles.* 9(3), pp.253-268.
100. Rahman M.S., and Islam M.Z. 2017. Scope and approaches of integrating sustainability issues in public procurement process for sustainable development of Bangladesh. *International Journal of Procurement Management.* 10(2), pp.163-177.
101. Rainville A. 2017. Standards in green public procurement – A framework to enhance innovation. *Journal of Cleaner Production.* 167, pp.1067-1037.
102. Rehmatulla N., Smith T., and Tibbles L. 2017. The relationship between EU's public procurement policies and energy efficiency of ferries in the EU. *Marine Policy.* 75, pp.278-289.
103. Roman, A.V. 2017. Institutionalizing sustainability: a structural equation model of sustainable procurement in US public agencies. Tracing the effects of politicization on public procurement specialists' decision-making through values: A structural equation model of the broker-purist lens. *Journal of Public Procurement.* 17 (1), pp.52-87.
104. Stefani G., Tiberti M., Lombardi G.V., Cei L., and Sacchi G. 2017. Public food procurement: A systematic literature review. *International Journal on Food System Dynamics.* 8(4), pp.270-283.
105. Trindade P.C., Antunes P., and Partidário P. 2017. SPP toolbox: Supporting sustainable public procurement in the context of socio-technical transitions. *Sustainability (Switzerland).* 1(67), pp.1-26.
106. Tsai W.T. 2017. Green public procurement and green-mark products strategies for mitigating greenhouse gas emissions—experience from Taiwan. *Mitigation and Adaptation Strategies for Global Change.* 22(5), pp.729-742.

107. Yang J.B., Chou H.Y. 2017. Key challenges in executing energy-savings performance contracts in public buildings: Taiwan experience. *Journal of the Chinese Institute of Engineers.* 40(6) pp.482-491.

Appendix F: Coding categories table

Coding categories	Codes	Description
Article types	Research/ empirical	A study that analyses data, whether quantitative (numerical, e.g. statistics) or qualitative (non-numerical, e.g. interviews).
	Literature review	A scholarly paper, which summarises extant knowledge and includes substantive findings, as well as theoretical and methodological contributions to a topic. Literature reviews contain secondary sources and do not report new or original work.
	Conceptual	A study that does not analyse any data. It is contrasted with an empirical/research study. Conceptual papers focus on a concept or theory that explains or describes the phenomenon being studied.
	Discussion	These provide an avenue for emerging work. These papers are more broadly accessible and offer a more balanced perspective. They place the analysis in the wider context of extant literature on a topic and consider the policy implications. Whilst a discussion is developed in these papers, they do not go beyond this (i.e. no primary research).
Method	Secondary data	Secondary data refers to data that was collected by someone other than the researcher for alternative purposes.
	Survey	A method of gathering information from individuals. Surveys have a variety of purposes and can be conducted in manifold ways, e.g. over the telephone, by mail, in person, online.
	Case studies	A *case study* is a research method that involves an up-close, in-depth, and detailed examination of a subject of *study* (the case*),* as well as its related contextual conditions.
	Interviews	The qualitative research interview seeks to describe the meanings and central themes in the life-world of the subjects via participant engagement.
	Mixed-methods	Research that involves collecting, analysing and integrating quantitative (e.g., experiments, surveys) and qualitative (e.g., focus groups, interviews) research.
	Multi-methods	More than one data collection technique is used, but this is restricted to either quantitative or qualitative.
	Literature review	Review of important secondary sources pertaining to a research topic.
	Conceptual	Conceptual research focuses on a concept or theory that explains or describes the phenomenon being studied. Generally used to develop new concepts or to reinterpret existing ones. A literature review might also be conducted here, but these papers do not claim to be a literature review.
	Discussion	May originate from various sources, including commissions/committees and staff, and is produced to provide balanced information on a particular topic without espousing a particular academic standpoint.

Appendix G: Research Strategies Choices Analysed

Research Strategy	Description	Strengths	Weaknesses	Researcher's comments
Case Study	'The detailed examination of a single example of a class of phenomena' (Abercrombie et al. 2000, p. 41). Involves a single case or few selected examples of entity'.	Intensive examination (Mason 2004, p. 127). Significant level of data used to build a case and improve internal validity. Triangulation or multiple methods of data collection can be used to improve internal validity (Bromley 1986; Yin 2015).	Prone to researcher bias. Requires access to multiple sources of data. Low generalisability (external validity).	There is no opportunity to obtain enough data to intensively examine. Does not align well with pragmatism. Change making is not a feature and required for the research.
Action Research	Iterative action-reflection research cycles are part of the process. Conclusion of one cycle becomes the basis of another cycle. 'Research in policy-related fields such as management is often carried out in the belief that the results will be applied to help solve important practical problems.' (Thomas 2004, p. 142).	Integrates theory and practice. Action research is focused on practical problems, rather than being purely driven by the theoretical interest of the social scientist (McNiff 2013). Central to this approach is developing knowledge and implementing change. Collaborative in nature, and participants are needed (Reason 2006). Collaborative relationships between academics and practitioners can be difficult (Thomas 2004, p. 144).	Goal dilemmas: aiming for practical and scientific outcomes. Practically speaking, this can be difficult to implement. Commitment and involvement needed. Can be difficult to achieve collaboration and participation. Suitable for medium to long-term research projects and can become a demanding strategy (Saunders et al. 2012). Focus on improving practice. Has been referred to as consulting.	Compliments abductive and pragmatist approaches. Provides the opportunity to implement change, which is needed in extant literature and in the real life setting. A flexible approach which can manage changes in the research setting, such as shifts in the research direction due to political change, e.g. access.

		Action research can contribute to theory and practice through abduction.		
Grounded Theory	Grounded theory is a research method that involves formulating a theory based on the gathered data. In other words, it turns the whole research process around. It is a set of rigorous research procedures that lead to the emergence of conceptual categories (Glaser and Strauss 1967).	Can identify the situated nature of knowledge, as well as the contingent nature of practice. Is better at determining what actually happens. Grounded theory adapts readily to studies of diverse phenomena. Can respond and change as conditions that affect behaviour change.	Tends to produce large amounts of data, which are often difficult to manage. Researchers need to be skilful. There are no standard rules to follow for the identification of categories	Although gathering data is useful, there is already extensive data in the literature review which can be used as a starting point and thus should not be ignored. The researcher must also be skilful in managing data, as too much data may cause restraints. The research setting require change to take place, making change is not a feature here.
Ethnography	Focuses on 'describing and understanding unfamiliar cultures and ways of life' (Thomas 2004, p. 133). The aim is to 'draw an overall picture of how the system works' (Fetterman 1998, p. 11), which requires a great degree of reflection. An ethnographic strategy is centred on total immersion, whereby the investigator lives/works with those being studied, learns their language and observes their life (Thomas 2004).	It is necessary to gain access to sites/participants over long periods of time. Often organisational-based (Rosen 1991). Key stages include fieldwork, formal analysis, writing up the ethnography. Can provide deep insights.	Access over a long period of time can be difficult to obtain. 'Some methods are seen as incompatible with scientific rigour' (Thomas 2004, p. 140). 'Writing ethnography is a major task.' (Thomas 2004, p. 140). Concerns over the researcher's objectivity, rigour and potential bias.	Unlikely to be able to secure that level of access and report on policy details. This research is not focused on an unfamiliar culture or way of life, and this it is not suitable for the research setting. However, can use ethnographic features in the research. Ethnography is challenging, but Wolcott (1975, p. 116) explains 'there is a bit of ethnographic talent in each of us'.

Appendix H: Cycle Two Interview Protocol

Group A

Introduction

Welcome participant. Provide overview of research.

Background

- Can you please tell me about your role and your organisation? Explore job role, organisation size, number of employees, location, structure and operation.
- What influenced you to start working in this area? If they mention passion, personal interest, etc., then ask: Have you always had an interest in this area? (they usually open up about their life, contributions, concerns, etc.)
- Purchasing information (procurer questions): product/service portfolio purchased by the organisation, total spend on each category, supply market engaged with.

Procurement

- Could you talk me through the procurement processes you follow? Explore: Size of purchases, variation in processes, products and services purchased.
- Can you talk me about any laws or policies followed during procurement?
- How are procurement decisions are made? Explore: Who is involved, interaction internally, supplier interaction, laws etc.

LCP

- How do(es) you/your organisation approach LCP?
- What is your understanding of LCP?
- How has LCP evolved over time within the public sector?
- Could you tell me about how LCP is implemented? Explore: Procurement policy, processes/rules, procurement tools, guidelines, procedures, contract/framework requirements.

Procurement tools

- How would you describe your experience of using procurement tools and procedures? Explore: Challenges/difficulties faced. What enables LCP? Ask for examples.
- Could you tell me how they support LCP?

Suppliers

- Can you tell me about any information requested or obligations made with suppliers to support LCP? Explore: Certification (ask for examples, explore how carbon is covered within them), Carbon management, Contract requirements.

Implementation

- Can you talk me through what or who you see to be driving LCP in the public sector? Explore: legislation, policy, individuals, leadership, etc.

- How has your organisation/sector facilitated the implementation of LCP? Explore: culture, resource, structures, awareness.
- What do you think about the current support available for the implementation of LCP? Explore: tools, training received.
- What do you think are the main barriers to the implementation of LCP? Explore: managers, tools, resource etc.
- Can you give me an example?
- What do you think LCP needed to implement?

Operating condition

Can you tell me about the current operating environment within the public sector? Could you describe how it affects the implementation of LCP?

Group B

Introduction

Welcome participant. Provide overview of research.

Background

- Can you please tell me about your role and your organisation? Explore job role, organisation size, number of employees, location, structure and operation.
- What influenced you to start working in this area? If they mention passion, personal interest, etc., then ask: Have you always had an interest in this area? (they usually open up about their life, contributions, concerns, etc.)

Procurement

- Could you talk me through the procurement processes the sector follow(s)?
- Can you tell me more about how procurement decisions are made? Explore: Who is involved, interaction internally, supplier interaction, laws etc.
- Could you tell me about how LCP is implemented? Explore: Procurement policy, processes/rules, procurement tools, guidelines, procedures, contract/framework requirements.

LCP

- Can you talk me through your role in relation to LCP?
- What is the sector's understanding of LCP? How would you define LCP?
- How has LCP evolved over time within the public sector?

Procurement tools (policy questions)

- How would you describe the sector's experience of using tools and procedures? Explore: Challenges/difficulties faced. What enables LCP? Ask for examples.

Implementation

- Can you talk me through what or who you see to be driving LCP in the public sector? Explore: legislation, policy, individuals, leadership, etc.
- How has your organisation/sector facilitated the implementation of LCP? Explore: culture, resource, structures, awareness.
- What do you think about the current support available for the implementation of LCP? Explore: tools, training received.
- What do you think are the main barriers to the implementation of LCP? Explore: managers, tools, resource etc.
- Can you give me an example?
- What do you think LCP needed to implement?

Operating condition

- Can you tell me about the current operating environment within the public sector?
- Could you describe how it affects the implementation of LCP?

Appendix I: Workshop activities

Activity One: Understanding the whole life cycle of your product and service

It is important to understand the life-cycle of products and services to understand carbon dioxide emissions. Carbon dioxide (carbon) is emitted into the atmosphere through the life-cycle of a product/service. This is the approach taken when looking at carbon footprints.

The life-cycle encompasses procuring a product or service from the beginning of its journey (cradle) to end of life management (grave). The Sustainability Risk Assessment (SRA) tool aids this process when used effectively.

The focus here is on the *"cradle to grave"* or *even "cradle to revival"* in those cases where products are recycled.

Task A:

(3) Please draw the life-cycle of a key product or service you often buy for the NHS?

Tips:

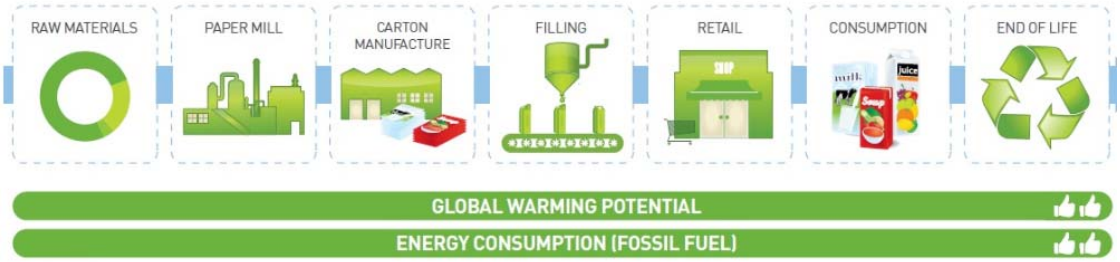
- Be as creative as you want with your drawing
- Think about what makes your product or service
- Think where there might be carbon emitted

(4) In pairs, pick one of the products/services drawn. Discuss with a partner where you think there might be carbon emissions emitted into the atmosphere?

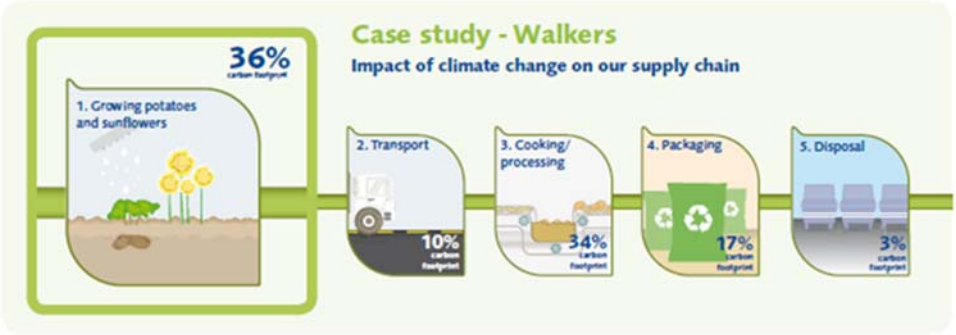
Here are 3 examples of product life-cycles to get you thinking….

<u>Example 1: Generic example</u>

Example 2: The production of drink cartons



Example 3: Walkers' crisps carbon footprint (Source: PepsiCoUK 2010, p. 16)



Task B:

(1) Complete the Sustainability Risk Assessment (SRA) in pairs briefly.

(2) Discuss which parts of the SRA looks at carbon dioxide and whole life-cycle?

(3) What are your thoughts about the SRA?

Activity Two: Stakeholder mapping and understanding impacts

It is important to understand stakeholders when talking about carbon dioxide emissions. Stakeholders are any group or individuals who can affect or are affected by your procurement activity. They can be both internal to your organisation and external to your organisation.

Some examples to get you thinking….

Task

(4) Adopting a life-cycle approach, in pairs write down your internal and external stakeholders for the products/services selected in activity one.

(5) How might they affect or be affected by the procurement of these products/services?

(6) What helps and hinders this process?

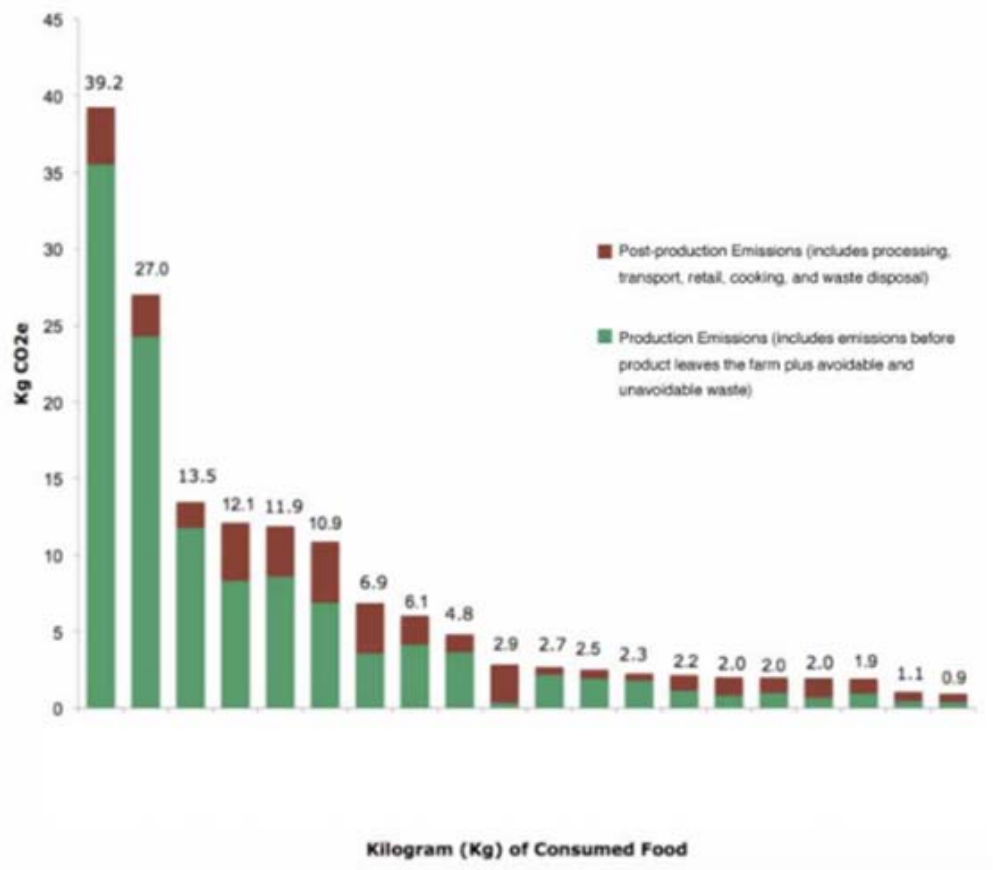
Activity Three: Hotspots

The list below shows a number of common food items:

- Farmed Salmon
- Turkey
- Chicken
- Beef
- Milk (2%)
- Tomatoes
- Lentils
- Canned Tuna
- Eggs
- Potatoes
- Rice
- Peanut Butter
- Lamb
- Cheese
- Broccoli
- Tofu
- Dry Beans
- Pork
- Nuts
- Yoghurt

These items have been plotted on the chart below according to their carbon impact.

Task: Which two items have the highest carbon impact by kilogram? Why?
Discuss in pairs (10 mins)



Activity Four: Zoning into hotspots

You have been tasked with reducing 20% of carbon emissions through your procurement activity. You can do this by focusing either on a single product or across a whole product range.

Part A

1. Identify a hotspot (or two) for the product/across the product range (e.g. waste, deliveries and high footprint items).
2. Identify where you are in the procurement process (e.g. beginning, tender process, in contact, coming to end of contract).

Part B

1. **Discuss in detail** what you will do to make the reductions? How will you handle challenges?
2. What tools will you use? When? Why?
3. Who are your stakeholders? Where and how can you get them involved?

Things to consider:

- Lifecycle analysis: cradle to grave/revival (recycling)
- Carbon reduction: rethink, reduce, reuse, recycle
- You have tools and stakeholders at hand that can help!

Appendix J: Organisation List

Across the three cycles, a total of 22 organisations were involved in the research. The names of the organisations are listed between in alphabetical order:

1. Business Wales (Menter a Busnes)
2. Cadw - Welsh Government's Historic Environment Service
3. Carbon Trust
4. Carmarthenshire County Council
5. Cardiff Council
6. Climate Change Commission for Wales (CCCW)
7. Constructing Excellence Wales (CEW)
8. Dow Corning Limited
9. Energy Saving Trust (EST)
10. Federation for Small Businesses (FSB)
11. Higher Education Funding Council for Wales (HEFCEW)
12. National Procurement Services (NPS)
13. NHS - Shared Services
14. National Museum Wales
15. Rhondda Cynon Taf CBC
16. Sustain Wales
17. University of South Wales (UWIC)
18. Value Wales (VW)
19. Waste & Resources Action Programme (WRAP)
20. Welsh Local Government Association (WLGA)
21. Wales Council for Voluntary Action (WCVA)
22. Welsh Government (WAG/WG)

Appendix K: Ethical approval form

ETHICS 2

FULL ETHICAL APPROVAL FORM (STAFF/PHD STUDENTS) or students referring their form for a full ethical review

(For guidance on how to complete this form, please see Learning Central – CARBS RESEARCH ETHICS)

If your research will involve patients or patient data in the NHS then you should secure approval from the NHS National Research Ethics Service. Online applications are available on http://www.nres.npsa.nhs.uk/applicants/

NB: Safety Guidelines for researchers working alone on projects – please go to this University's web link to learn about safety policies - http://www.cf.ac.uk/osheu/index.html

Name of Lead Researcher: Hushneara Begum

School: Cardiff Business School

Email: Begumh4@cardiff.ac.uk

Names of other Researchers:
N/A

Email addresses of other Researchers:
N/A

Title of Project:

The carbon procurement process in Wales.

Start and Estimated End Date of Project: 05 Feb 2016 - 01 Dec 2016

Aims and Objectives of the Research Project:
The research project is a study which will be conducted working in partnership with the Climate Change Commission for Wales (CCCW) and Value Wales (VW). The CCCW brings together key sectors and organisations across Wales to build consensus on the actions needed to tackle climate change matters in Wales.

Aim
The research will examine how stakeholder engagement, networks and sense-making takes place in pursuit of reducing carbon emissions through procurement in Wales. The aim is to collect data through the use of interviews, workshops and questionnaires using action research. As part of the process suggestions will be made and changes will be put in place with regards to improving carbon assessment in the procurement process.

Objectives
- To perform exploratory research to investigate how stakeholder engagement, networks and sense-making takes place in pursuit of reducing carbon emissions through procurement in Welsh organisations.
- To conduct a focused review of recent academic literature on managing carbon in the purchasing and supply process.
- To present the findings to the Climate Change Commission of Wales and within Cardiff University.

Please indicate any sources of funding for this project:

N/A

1. *Describe the methodology to be applied in the project*

The methodology will entail of semi-structured interviews, workshops and questionnaires conducted with relevant organisations and stakeholders.

The interview questions will be in the following general areas:

- background information about the organisation, its size, number of employees, location, role etc;
- purchasing information about the product / service portfolio purchased by the organisation, total spend in each category, supply markets engaged with;
- how carbon is currently considered within the procurement process, and the information required from suppliers on their carbon management;
- How they make sense/understand carbon within procurement;
- Who do they engage with (network) to make sense of carbon within procurement;
- What tools are used to support carbon reduction;
- Who are communicate with/consider as stakeholders in terms of procurement and carbon; how are they communicated with;
- future plans for managing carbon through procurement; and
- perceived barriers and constraints to those plans

All participants will be fully briefed and consent will be obtained prior to an interview being conducted. Participants will be informed they will be participating voluntarily and can withdraw at any point. Interviews will be recorded, transcribed and summarised. All findings will be analysed by the research team and participants will be given the opportunity to have a copy of the findings. Transcripts and recordings will be encrypted on a secure machine with only the researchers aware of the encryption.

Workshops will involve roughly 20 individuals with the objective to unpack how they understand, make sense of carbon, who they network with and tools they use in this area to share understanding and build consensus. Due to the nature of workshops participants present will be aware of others attendance. However, participant data reported for research purposes will be not be anonymised.

The Twenty Statements Questionnaire/Test (attached) will be introduced, to helpfully understanding different perceptions of carbon within procurement. Interviewees will be given an opportunity to voluntarily complete Twenty Statements Questionnaire, if time permits.

PLEASE ATTACH COPIES OF QUESTIONNAIRES OR INTERVIEW TOPIC GUIDES TO THIS APPLICATION

2. *Describe the participant sample who will be contacted for this Research Project. You need to consider the number of participants, their age, gender, recruitment methods and exclusion/inclusion criteria*

Members of the Commission represent a wide range of political, business, local authority, third sector and other organisations. The sample consists of senior roles in the area of 'procurements' in organisations in Wales, members of the Climate Change Commission for Wales. When scoping and shortlisting prospective participants with the sponsors, their organisational position and influence in procurement in their given organisation is a deciding factor.

Some prospective organisations have already expressed their interest to the commission to take part in the study and given consent to the commission to be contacted by researchers. The research team will make contact introducing the project via email. Informed consent will be obtained prior to an interview being conducted. Organisational consent, confidentially and availability will be covered. All data gathered from research will be kept confidential and handled for the use of this project only.

3. *Describe the method by which you intend to gain consent from participants.*

Consent will be obtained through an initial introductory email/letter briefly outlining the project and getting their interest to participate.

Informed consent will be obtained with the use of a consent form (see copy attached). This will be provided to the participant prior to the interview/workshop to sign and return or confirmed consent to terms back by email (whichever is more convenient for the participant). A sample copy has been attached.

PLEASE ATTACH A COPY OF ALL INFORMATION WHICH WILL BE GIVEN TO PROSPECTIVE PARTICIPANTS (including invitation letter, briefing documents and, if appropriate, the consent form you will be using).

4. *Please make a clear and concise statement of the ethical considerations raised by the project and how you intend to deal with them throughout the duration of the project (please use additional sheets where necessary)*

Ethical consideration has been taken into account by the research team. As a result the methodology employed makes sure participants give their informed consent with the option, of course, to withdraw any time should they wish/desire. Furthermore, all data gathered will be handled professionally and kept anonymous.

STUDENTS SHOULD BIND THE SIGNED AND APPROVED FORM INTO THEIR REPORT, DISSERTATION OR THESIS.

Please complete the following in relation to your research project:

		Yes	No	n/a
(a)	Will you describe the main details of the research process to participants in advance, so that they are informed about what to expect?	X	☐	☐
(b)	Will you tell participants that their participation is voluntary?	X	☐	☐
(c)	Will you obtain written consent for participation?	X	☐	☐
(d)	Will you tell participants that they may withdraw from the research at any time and for any reason?	X	☐	☐
(e)	If you are using a questionnaire, will you give participants the option of omitting questions they do not want to answer?	X	☐	☐
(f)	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	X	☐	☐
(g)	Will you offer to send participants findings from the research (e.g. copies of publications arising from the research)?	X	☐	☐
(h)	If working with children and young people please confirm that you have visited this website : Working with children and young people and Vunerable Adults please go to weblink - http://www.cf.ac.uk/govrn/cocom/resources/2010%November%Safeguarding%20Children%20&20VA's.doc	☐	☐	X

PLEASE NOTE:
If you have ticked **No** to any of 5(a) to 5(g), please give an explanation on a separate sheet.

(Note: N/A = not applicable)

There is an obligation on the principal researcher/student to bring to the attention of Cardiff Business School Ethics Committee any issues with ethical implications not clearly covered by the above checklist.

Signed:
(Principal Researcher/Student) A Begum

Print Name: Hushnara Begum

Date: 02/02/16

SUPERVISOR'S DECLARATION (Student researchers only): As the supervisor for this student project I confirm that I believe that all research ethical issues have been dealt with in accordance with University policy and the research ethics guidelines of the relevant professional organisation.

Signed:

Print Name:

Date:

TWO copies of this form (and attachments) MUST BE OFFICIALLY STAMPED by Ms Lainey Clayton, Room F43, Cardiff Business School

APPLICATION APPROVED
Research Ethics Committee
Cardiff Business School
Cardiff University

STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed School procedures and is now approved.

Official stamp of approval of the School Research Ethics Committee:

Date: 6/4/2016